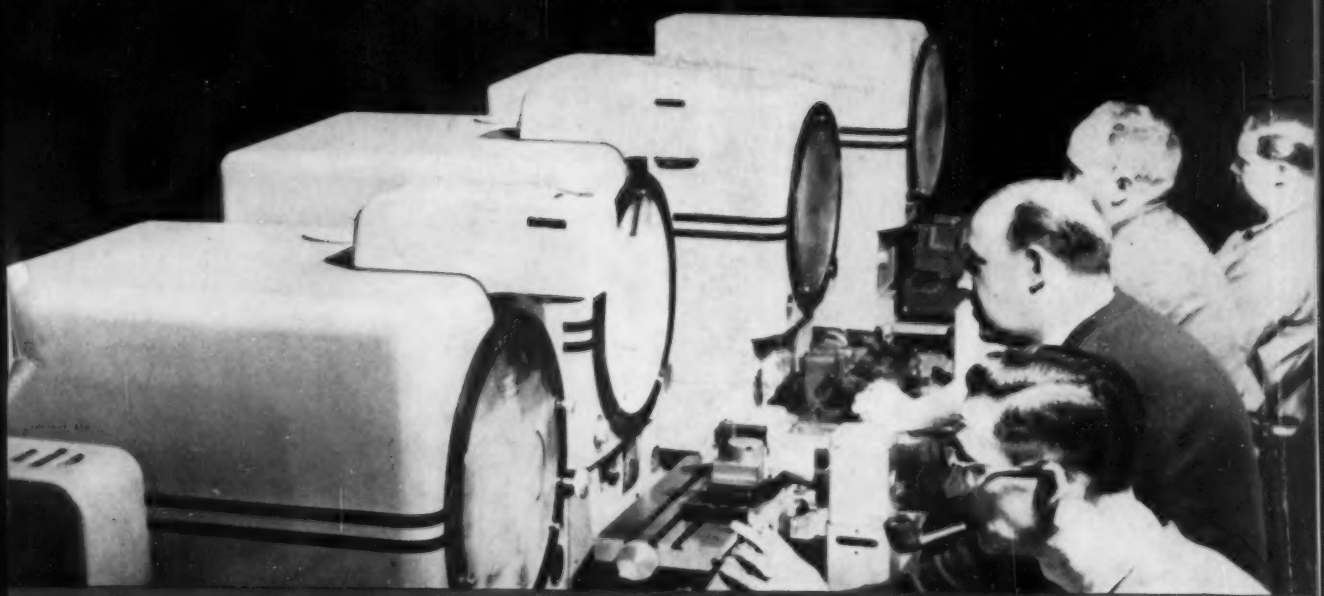
METAL SHOW ISSUE

September 27, 1956

The IRON AGE

The National Metalworking Weekly



More for Your Inspection Dollar

See Page 209

Digest of the Week P – 2

THE OTHER TURN

POOR SHORTY, HE REALLY BURNS WHEN WE TELL HIM," BIG FELLOWS ON THE END, LITTLE ONES IN THE FRONT."
YEAH, I WONDER WHEN THAT NEW MAN'LL BE WELL ENOUGH TO COME BACK TO WORK, THE ONE THAT ASKED SHORTY WHY HE DIDN'T USE A BOX BACK THERE.
ONE OF THESE DAYS THAT ROD WILL STICK IN THE BANK AND SHORTY'LL BE HANGIN' UP THERE 'TIL IT BURNS OFF!
-D-!-?-
MANY THANKS TO THE OPEN HEARTH CREW, EDGEWATER STEEL CO PITTSBURGH, PA
KEKEG

The Short Temper

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

XVII

This is the seventeenth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Uses of Aluminum in Alloy Steels

Aluminum as an element has been known to chemists and metallurgists for many years. It is never found in nature in its metallic state, being derived chiefly from bauxite, an aluminum hydroxide. Bauxite is present in various parts of the world, including several tropical and semi-tropical regions.

When used in the making of alloy steels, aluminum has several important functions. Because of its great affinity for oxygen, it is a reliable deoxidizer. It produces fine austenitic grain size. And when it is present in amounts of approximately 1 pct, it promotes nitriding. The nitriding process could be described as surface- or case-hardening by means of a nitrogenous medium, or by heating in an atmosphere of ammonia gas and dissociated ammonia mixed in proper proportions.

Other effective agents in producing nitrided cases are chromium, vanadium, tungsten, and molybdenum. As a rule, however, the hardest cases are obtained with aluminum-bearing steels, the nitriding grades being a good example. These are usually steels of medium carbon content with additions of chromium, molybdenum, and sometimes nickel.

Generally speaking, the lower the effective nitriding temperature, the harder the case will be. Aluminum-bearing steels usually show a case-hardness range of 950 to 1150 DPHN (diamond pyramid hardness number). Steels in which no aluminum is present have cases of substantially lower hardness.

If you would care to know more about aluminum as an addition or alloying agent in steels, Bethlehem metallurgists will gladly give you full information. Just write or call us; our technicians are always at your service. They will do everything possible to help make your problems easier. And whenever you need new supplies of alloy steels, remember that Bethlehem manufactures the full range of AISI standard alloy grades, as well as special-analysis steels and all carbon grades.

If you would like reprints of this series of advertisements from No. I through XVI inclusive, please write to us, addressing your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. The first 16 topics are now available in a convenient 32-page booklet, "Quick Facts About Alloy Steels," and we shall be glad to send you a free copy.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Sept. 27, 1956—Vol. 178, No. 13

The IRON AGE

Digest of the Week in Metalworking

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Address mail to The IRON AGE
Chestnut and 56th Sts. Philadelphia 39, Pa.

NEWS DEVELOPMENTS

CLEVELAND METALWORKING SETS FAST PACE P. 163

City's phenomenal industrial growth has attracted 1207 plants and 43,000 workers since 1946. Parts producers form a major segment, but two-thirds of all types of industrial products are made in Cleveland.

HOW TO BEAT FACTORY NOISE PROBLEM P. 166

Employee claims for damaged hearing are climbing fast. Programs combatting noise problems pay off in improved worker morale as well as fewer damage claims.

STEEL LABOR AIMS FOR WHITE COLLAR GROUP P. 168

United Steelworkers set cap for office and technical workers. Also plan demand for short work week when three-year contract expires. Union convention votes pay raise for McDonald, higher monthly dues.

SHEETS MAY BE TOO SHORT TO COVER SCHEDULES P. 171

Storm signals are up on supply of both cold and hot rolled sheets in the

fourth quarter. Some consumers have already been quizzed on how much of a cutback they would stand for.

EFFECTIVE INSPECTION is the heart of any good quality control system. Here, a bank of optical comparators helps E. W. Bliss Co. keep a close eye on dimensional accuracy. See special feature "How to Get More For Your Inspection Dollar" summarized below and beginning on p 209.

CONFERENCE PREDICTS 1957 BIGGER THAN 1956 P. 170

National Industrial Conference predicts 1957 will top current year. Management quizzed is reticent to talk beyond 6 months. But optimism prevails for entire year. Steel expected to lead the way. Howard V. Clark, Detroit Steel Co., predicts 90 pct steel operating rate.

SPECIAL FEATURES

HOW TO GET MORE FOR YOUR INSPECTION DOLLAR P. 209

Quality control, as a method of management, depends upon inspection for its implementation. But what kind of inspection, and how much? Obviously, there's no pat answer to every inspection problem in the metalworking industry. But there can be a logical approach to finding answer.

ORGANIZATION'S A GOOD JUMPING-OFF POINT

So start by setting up your organization—the kind that fits your operations confortably and efficiently. Then consider personnel requirements, standards, equipment, the types of inspection that you can't afford to be without. Covering these and related matters, this feature, aimed at making your inspection dollar make more sense, discusses virtually every facet of inspection that really counts.

SINCE 'INSPECTION' COVERS A LOT OF GROUND . . .

Material has been subdivided into two major sections for your convenience. The first covers Objectives — the where you want to go and what you want to accomplish angles. The second, Organization, covers some of the practical ways you can go about implementing your program.

AMONG SOME SPECIFIC MATTERS TOUCHED ON ARE . . .

The concept of inspection vs quality control; objectives; standards; receiving, in-process-and-rework, and salvage inspection; the master plan; functions; personnel, job descriptions and evaluations, and equipment are some of the matters discussed. Practical shop experiences point up various problems covered in the text. They serve to keep the various points made down-to-earth and direct.

AIM IS TO SET FORTH UNDERLYING PRINCIPLES

While specific approaches and problems are dealt with, the "basics" of quality control and inspection, those fundamentals which apply to all plants' problems, small or large, are the framework for this special feature. Most shops can profit from the points it makes.

MARKETS AND PRICES

CANMAKERS PRESERVE HEALTHY SALES LEVEL P. 169

Industry may top by 10 pct its mark of $1.5 billion in sales for '55. Major customers, besides food, are beverages, animal food makers. New products in development include tinless tin cans, aluminum containers. Rumors indicate latter may be in other than conventional shape.

DOES PRESTIGE JUSTIFY THE CONTINENTAL? P. 180

Faced with drastic production cutbacks for 1957, Continental Div. of Ford Motor Co. is relying on the prestige its institutional advertising gives to Ford Motor Co., as offsetting a possible financial loss. Some dealers are willingly forfeiting franchises.

FARWEST SETS PACE IN NATURAL GAS INDUSTRY P. 187

Metalworking there will get healthy share of $7.3 billion to be spent for new pipelines and utility expansion. Area shows biggest growth in new gas customers. Also is a leader in designing of gas appliances.

MACHINE TOOL EQUIPMENT SALES HIGHER P. 189

First half statistics show shipments by the metalworking equipment industry are $81.5 million ahead of 1955. A slight decline in metal forming machinery is expected but other lines have order backlogs.

TIGHT STEEL MARKET WILL CARRY INTO 1957 P. 305

Momentum of tight steel market will carry over into 1957. Continued strong industrial activity virtually assures heavy carryovers after year's end. Sheet consumers beginning to worry about fourth quarter.

NEXT WEEK:

OXYGEN PRODUCERS SHARE IN STEEL'S FUTURE

As steel expansion rolls into high gear, oxygen steelmaking processes will also gather steam. New steel facilities will depend heavily on proven oxygen processes as well as a new process.

WHAT'S THE FUTURE OF TAFT-HARTLEY ACT?

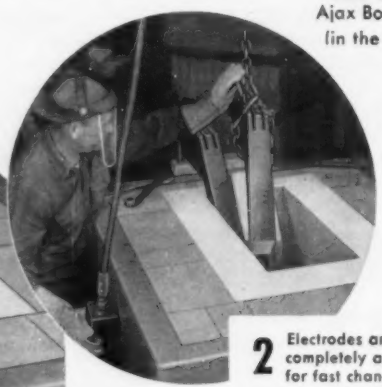
T-H has been the labor law for a decade. Periodic attempts to repeal or amend it have failed, but once again it's an election issue. Next week's Special Report analyzes opinion of T-H on Capitol Hill, evaluates Administration's attitude.

Now! CHANGE SUBMERGED ELECTRODES IN AN HOUR!

. . . without disturbing furnace casing or pot
. . . at substantial savings of labor, material and time

1 Just hoist the removable tile covering . . .

SEE IT AT THE SHOW!
Ajax Booth 1609
(in the Arcade)



2 Electrodes are now completely accessible for fast changing.

AJAX
HULTGREN
electric
SALT
BATH
furnaces

In this unique new Ajax Electric Salt Bath*, electrodes enter the furnace from over the top, *yet retain all the favorable characteristics of the submerged design.* They are replaced by hoisting a removable tile, putting in new ones and setting the tile back in place.

It's as simple as that! No need to disturb either the pot or furnace casing. "Down time" is held to an absolute minimum. Salt is saved. Spare casings are no longer required. A complete electrode change takes about an hour per pair. Often, the change can be accomplished before the molten salt can solidify.

Write for bulletin giving details of this revolutionary design feature for either new or old Ajax Electric Salt Bath Furnaces.

ALL THE ADVANTAGES OF COMPLETELY SUBMERGED ELECTRODE DESIGN!

The removable tile covering seals the electrodes against air, thus giving all the advantages of submerged design including protection against oxidation at the salt line. Life of new type Ajax electrodes using no critical materials compares more than favorably with that of conventional nickel alloy electrodes in conventional-electrode furnaces.

*Patent Pending

AJAX ELECTRIC COMPANY
904 FRANKFORD AVENUE, PHILADELPHIA 23, PA.

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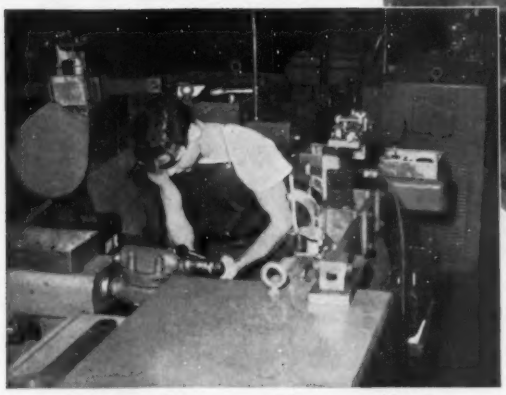
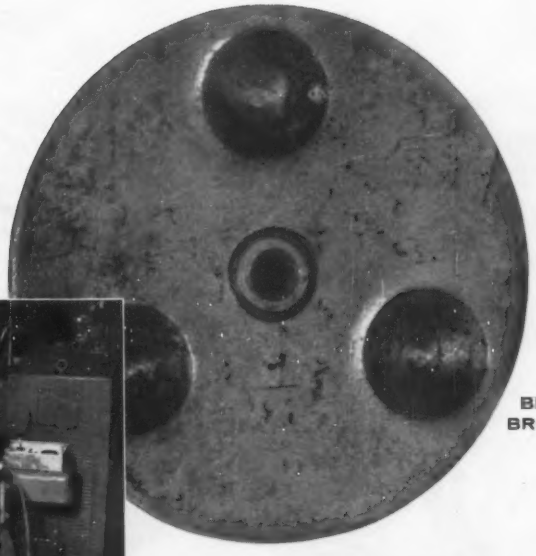
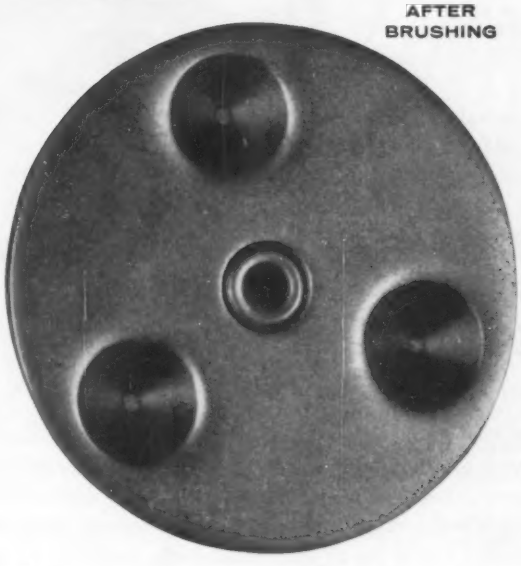


A manufacturer of computers and business machines improves the quality of precision components, greatly reduces costs using Osborn Brushamatic machines.



BEFORE BRUSHING

AFTER BRUSHING



Low price on high finish

A few years ago, precision parts were finished in custom lots at considerable cost. Today, Osborn power brushing methods put finer finishes on precision parts at mass-production rates.

The business machine component shown above is typical. Brushamatic® Machines put a high, mirror-like finish on all flat and depressed surfaces of this ball retainer in just 25 seconds—*finish 6 parts for the former cost of finishing 1.*

An **O**sborn **B**rushing **A**nalysis, made in your plant at no obligation, will show how *you* can use Brushamatic® methods to produce finer finishes at lower cost. Write THE OSBORN MANUFACTURING COMPANY, DEPT. F-50, 5401 HAMILTON AVENUE, CLEVELAND 14, OHIO.

Osborn Brushes

OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

Independent Armco Distributor

averts plant shutdown with two-hour delivery

A vital part failed, threatening a metal fabricator with total shutdown. Experience told him what to do. He quickly phoned the part specifications to his Armco Steel Distributor. Two hours later the flame-cut plate he needed was at the airport, where it was picked up by his plane. A costly shutdown was averted.

"Rescue" service, illustrated by this actual case, is only one of the valuable jobs performed by independent distributors of Armco Steels across the country. Even more important, they feed steel to the many thousands of small manufacturers so necessary to the healthy growth of the American economy. Big companies benefit, too, from prompt, efficient warehouse service.

Free Storage Space

By serving as rent-free stockrooms for manufacturers, independent suppliers of Armco Steels free storage space and inventory capital for profitable investment in new equipment. Since they supply steel "custom-tailored" for each buyer, scrap losses are cut down too.

Simplify Buying

Armco Distributors' great variety of stocks makes them shopping centers of industry—helps eliminate complicated and costly many-source buying. They carry complete stocks for their customers of one or more of these Armco Special Purpose Steels:

Stainless steels, Armco ZINCGRIP® and ZINCGRIP PAINTGRIP® Steels, Armco Enameling Iron, Cold Rolled PAINTGRIP, Welded Steel Tubing, Magnetic Ingot Iron and Electrical Steels.

By making these and other basic steels and steel products readily available, Armco Distributors from coast to coast help keep industry supplied and paychecks full. Make it a point to become acquainted with the independent Armco Distributor in *your* community.

ARMCO STEEL CORPORATION

2256 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

The IRON AGE
FOUNDED 1855

Chestnut and 56th Sts.
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Indexed in the Industrial Arts Index and the Engineering Index.

BPA NBP

EDITORIAL

It's Imbecilic to Trust the Reds

◆ FOR YEARS the Communists have been taking us for a ride. Our yearning to give the other fellow a break and the desire to believe what we want to believe has helped do the trick.

The Reds have gained much by our gullibility. They have enslaved 800 million people. And they parade before the free nations as if they were entitled to just and honorable treatment.

There are still those in this country who are ready to believe that the "Reds are changing." They are changing but it does not bode well for us.

The satellite nations are colonies of the Reds yet the latter roar against the "imperialists." At every corner of the earth the Russians are in there pitching—to turn everyone in the Middle East and elsewhere against us.

Because "Krush" and "Bulgy" hit the road—and the booze—on good-will tours, we are to believe that they are the "new" Russians. We are to close our eyes to the cold fact that they are of the same tribe as Stalin whom they now disown and would bury in the mud.

If this were all, our job would not be so hard in the years to come. Though they are ham actors and irresponsible heads of a major government, they are extremely dangerous individuals. Morals and justice to them are traits other people have that can be exploited.

Our government seems to feel that it must soft-pedal the real characteristics of the "new" Russian leaders. Maybe that is necessary on the world stage. But it doesn't mean we have to fall for their claptrap and cheap diabolical tricks.

Mr. Eisenhower isn't being fooled. His letters to Bulganin made it plain we were not being taken in—or at least Ike wasn't. But as usual the President's messages to the Russian premier probably were read by a small number of Americans. Ike said simply that the Reds hadn't changed much.

Don't be misled by the home-coming tourists who would impress you with their trip to Russia. Nor should you fall for the trade "wind" coming from Moscow. The Reds want only one thing —to become strong no matter what method is used so that they can defeat the free world.

They are not to be trusted!

Tom Campbell

EDITOR-IN-CHIEF

Announcing
two NEW welder models

. . . that set new standards in modern arc welding with their wider welding range, greater speeds and extra features.

See and try them at the METAL SHOW Oct. 8 thru 12 Space 2541 lower exhibition hall

* Both models equipped with **REMOTE CONTROL**

NEW ac-dc welder and NEW dc rectifier welder

Now you can have greater welder performance, more versatility for a much wider range of welding, and a new ease of operation. This new AC-DC Welder lets you take full advantage of the latest types of electrodes and sizes for both AC or DC welding. Makes every job easier with added assurance of high quality welds at lower cost.

Models also available in this AC-DC unit for doing Inert Gas Welding. It's new—it's something you'll want to see and know about.

This new DC Rectifier offers outstanding features for better welder performance in keeping with modern developments in production equipment for lowering costs. Simplified controls and a wide welding range let you get into the low ranges with top quality, let you select polarity by a flip of the selector switch. You'll find many new improvements in this new light weight Rectifier. Get complete information for comparison. HOBART BROTHERS CO., Box IA-96, Troy, Ohio, Phone 21223.

"One of the world's largest builders of arc welding equipment"

SEE and TRY Hobart's new iron powder electrodes. You'll marvel at the new speeds and ease of handling of these new type electrodes that produce sound, strong, ductile welds at much lower cost. Ask about Hobart's Rocket 14, Rocket 24 and Rocket 27.

Use the coupon!

HOBART TROY OHIO WELDERS

HOBART BROTHERS COMPANY
Box IA-96, TROY, OHIO

I'm interested in the new

- ☐ *AC-DC Arc Welder*
- ☐ *AC-DC Arc Welder with Inert Gas Controls*
- ☐ *DC Rectifier*
- ☐ *Send catalog on other types of manual arc welders*

_____ *amp. capacity*

Name _____

Address _____

City _____ *State* _____

HOBART BROTHERS · ELECTRODES

dear editor:

letters from readers

Tough Job

Sir:

Congratulations on your timely Editorial "You Who Are About To Retire."

Retiring is tough work! *F. J. Crolius, Union Chill Mat Co., Pittsburgh, Pa.*

Steel Vs Concrete

Your article, "CONCRETE: A Rival for Structurals," (IRON AGE Aug. 23, 1956) implies that a $10,000 lower bid on the concrete design than on the steel design for a high school gymnasium at Greensboro, N. C., was due to a cost advantage of prestressed concrete over steel. Actually, this was due to other factors involving the overall designs for the entire building.

For this structure, the only valid comparison that can be made between the cost of prestressed concrete and structural steel is for the prestressed concrete girders vs. steel trusses separated from the cost of all other items. Fortunately, such a comparison can be made from the bids to the general contractor by the prestressed concrete subcontractor and the steel subcontractor.

Offset Price Advantage

The bid of the prestressed concrete subcontractor for the seven prestressed concrete girders, precast concrete roof purlins and the prestressing cables for the fourteen columns was $26,450. From this amount a deduction of approximately $5,000 must be made to arrive at the cost of the girders alone, namely $21,450. The steel subcontractor's price for seven steel trusses and bracing was $13,735. Both prices include erection. Thus the net saving in favor of steel is $7,715.

The higher bid on the so-called steel design was due to factors involving the overall designs which more than offset the price advantage steel trusses had over prestressed concrete girders. *E. E. Hanks, District Engineer, American Institute of Steel Construction, Inc., New York, N. Y.*

The Acme

Sir:

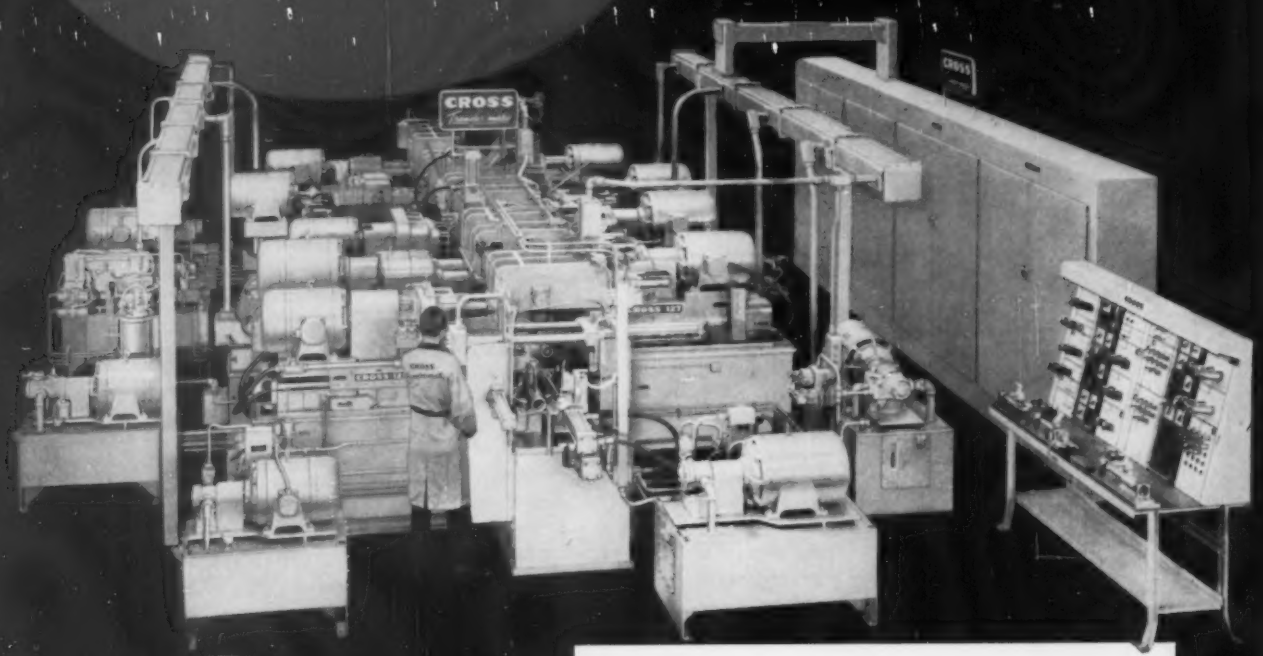
Your article on ultrasonic quenching which appeared in the August 30 issue proved extremely interesting and informative. We would like to have about ten reprints of this feature for some of the men in the Research and Development divisions of our Company who are currently involved in a series of heat treating experiments.

May we take this opportunity to congratulate you on a fine publication which we have always considered the acme of scientific reading. *W. L. Besselman, Coordinator of Technical Employment, Leeds and Northrup Co., Philadelphia, Pa.*

"Charlie is the most understanding foreman we have!"

Bores, Drills Chamfers, and Taps Rear Axle Housings

Another Transfer-matic by Cross



- ★ Rough and finish bores two tube holes; rough and semi-finish bores differential case bearing seats; rough and semi-finishes pinion shaft bore; drills, chamfers and taps ten cover screw holes.
- ★ 75 pieces per hour at 100% efficiency.
- ★ Twenty-two stations: one for loading, one for unloading, four for boring, two for back-boring, two for drilling, one for tapping, one for turn-over and ten for inspection.
- ★ Lift and carry transfer mechanism.
- ★ Cross Modular Unit Construction provides flexibility for part design changes.
- ★ All parts in Cross Machines—even details—are made to interchangeable tolerances for fast, easy maintenance.
- ★ Other features: Construction to JIC standards, hardened and ground ways, hydraulic feed and rapid traverse for boring and drilling, individual lead screw feed for tapping, automatic lubrication.

Established 1898

THE CROSS CO.

First in Automation

DETROIT 7, MICHIGAN

fatigue cracks

Write Your Own Ticket

We don't expect to see the day of automated editors but things are moving that way. If you push the right buttons a machine will tell you what jobs readers hold down, what they make, what kind of machinery they have in their shops.

Or it can survey all red-headed purchasing agents in plants employing 250 or more—or darn near it. Another machine makes it unnecessary for them to carry pencils in digging up stories; just push a button and record the interview.

In our Washington Bureau a wire service ticker clatters all day, tells staffers when hearings and press conferences are scheduled, pipes in all sorts of news, some political, some factual. The Bureau also has a machine that punches out stories on paper tape which is fed into a teletype at 60 words a min.

We're not setting type by remote control but we do have a new gadget in the office that makes train reservations by facsimile.

Big Time Saver

With the amount of editorial travel required to keep your IRON AGE revved up, this is a big time saver. Way it works (see cut) is that a gal tells the machine what type accommodation on what train the editors want. The Pennsylvania Railroad's new electronic board tells their operator at a glance just what's open and she writes out the ticket that appears on our machine.

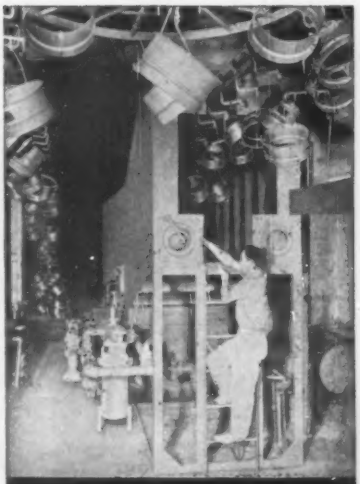
Somewhere along the line money must change hands but we haven't figured that part out yet. Also have a deal where the same gal—but not the same machine (heaven forbid)—writes out airline tickets based on a fast phone call. Since office boys are almost as short as engineers, this is progress.

Puzzlers

Mr. A. F. Stewart, Wheeling Corrugating Co., submitted the most abbreviated answer to the chain-prisoners-tower puzzler so for lack of space we'll use his with thanks rather than some of the 10 and 12 page solutions. (Aug. 16 puzzler).

1. Chain down
2. Page down—chain up
3. Daughter down—Page up
4. Chain down
5. King down—chain and daughter up
6. Chain down
7. Page down—chain up
8. Daughter down—Page up
9. Chain down
10. Page down—chain up
11. Chain down

. . . and winners all: Thomas W. Flanik, Republic Steel Corp.; Frank K. Remy; William R. Moss, Chicago Auto Wrecking Corp.; Eugene DeAngelis, Toledo Stamping & Mfg. Co.; C. W. McKinley, A. C. Spark Plug; Paul Koppel; Howard Schwartz, RCA; Paul Tandler, Lewin-Mathes Co.; John Homer, Jr., James Young and Henry Buresh, Collins Radio Co.; Dick Hautzenroeder, Massey Harris Ferguson; D. M. Ertner, Western Electric; Edmund D. Sickels, Wire and Wire Products; Wm. C. Mueller, Western Electric; Nels Johnson, Wireryte, Inc.; John W. Lee, R. G. Lee Tool Co., and D. L. from Houston, Texas, maybe.



SAVES $900 A WEEK

...new Cincinnati Finishing System at NuTone

This automatic painting and baking system, designed by CINCINNATI for NuTone, Inc., world-famous manufacturer of door chimes, ventilating fans and kitchen hoods, has increased production, sharply slashed finishing costs and doubled capacity per square foot area. Paint consumption is reduced to from 35 to 50% of what was formerly required.

Add to this a substantial increase in production, and you realize the higher efficiency NuTone has achieved, while saving more than $900 per week!

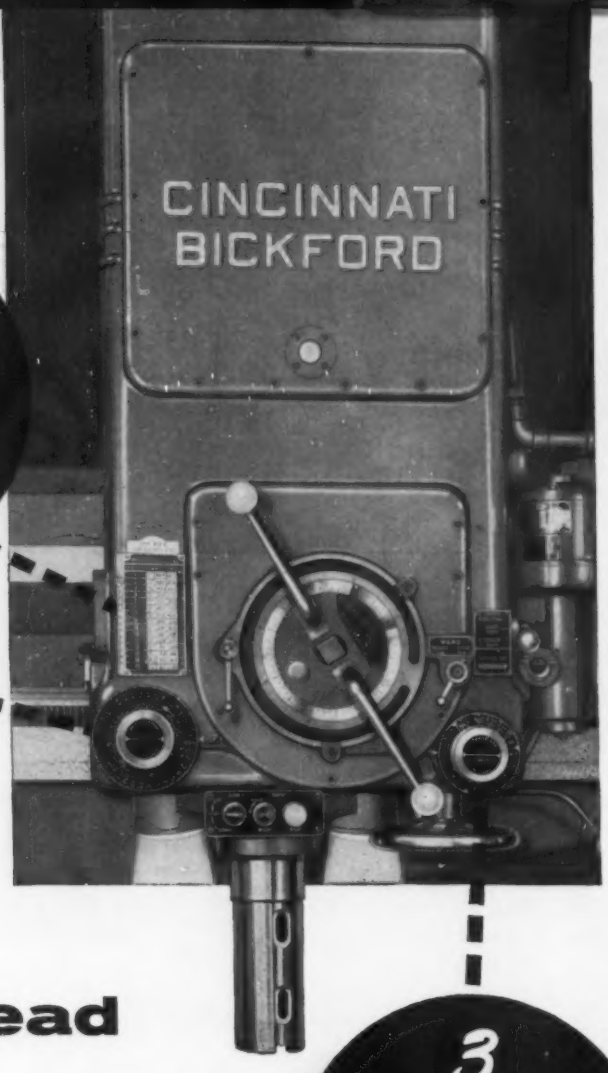
Let a CINCINNATI Cleaning and Finishing engineer take a look at your finishing costs. He'll give you a no-obligation analysis that can point to real savings for you.

Write today!

Cincinnati

THE CINCINNATI CLEANING AND FINISHING MACHINERY COMPANY

3019 Hageman St., Sharonville, Ohio, U.S.A.



1.

The Prescheduling Chart plans the sequence of operations . . . charts the proper speeds and feeds . . . is a permanent record of each tool diameter, speed and feed.

2.

Speed Dial — Preselects any one of 36 speeds while machine is in operation—shift is automatic at end of each operation.

The HEAD that's way ahead

. . . brings you 3 outstanding performance features!

3.

Feed Dial—Preselects any one of 18 feeds for next tool while machine is in operation — shifting is quiet and direct.

The concentration of complete control of all speeds and feeds by two easily read dials on the head is an outstanding advance in design.

Saves time — insures controlled correct operation — and is easy for the operator.

Hydraulic shift for speeds and feeds is quiet and positive. All mechanism for preselection is contained in the head. These ultra modern Super Service Radials have many other advanced features — for easy handling and high productivity.

Write for Bulletin R-33. You will be interested in the many new features.

CINCINNATI BICKFORD

SUPER C·B SERVICE

RADIAL AND UPRIGHT DRILLING MACHINES

CINCINNATI BICKFORD DIVISION

GIDDINGS & LEWIS MACHINE TOOL COMPANY

dates to remember

SEPTEMBER

Electrochemical Society, Inc.—Annual meeting, Sept. 30-Oct. 4, Hotel Statler, Cleveland. Society headquarters, 216 W. 102nd St., New York.

OCTOBER

American Institute of Electrical Engineers—Fall general meeting, Oct. 1-5, Morrison Hotel, Chicago. Society headquarters, 36 W. 46th St., New York.

Society of Automotive Engineers, Inc., —National aeronautic meeting, Oct. 2-6, Hotel Statler, Los Angeles, Calif. Society headquarters, 29 W. 39th St. New York.

EXPOSITIONS

American Mining Congress—Oct. 1-4, Los Angeles.

Metal Show—Oct. 8-12, Cleveland.

National Industrial Exposition & Management Conferences—Oct. 22-26, Detroit.

Third International Automation Exposition—Nov. 26-30, New York.

Standard Engineers, Society—Fifth annual meeting, Oct. 3-5, Hotel Willard Washington, D. C. Society headquarters, P. O. Box 281, Camden, N. J.

The Magnesium Assn.—Twelfth annual convention, Oct. 4-5, The Drake, Chicago. Society headquarters, 122 E. 42nd St. New York.

American Society of Mechanical Engineers—American Society of Lubrication Engineers,—Lubrication conference, Oct. 8-10, Chalfonte-Haddon Hall, Atlantic City, N. J. Society headquarters, 29 W. 39th St., New York.

The Material Handling Institute, Inc.—Fall meeting, Oct. 10-11, The Traymore Hotel, Atlantic City, N. J. Society headquarters, One Gateway Center, Pittsburgh.

American Institute of Mining & Metallurgical Engineers — Fall meeting, Oct. 12, Warwick Hotel, Philadelphia. Society headquarters, 29 W. 39th St., New York.

American Machine Tool Distributors' Assn.—Annual meeting, Oct. 15-16, Broadmoor Hotel, Colorado Springs. Assn. headquarters, 1900 Arch St., Philadelphia.

Rail Steel Bar Assn. — Semi-annual meeting, Oct. 15-16, Sheraton-Mount Hotel, Montreal, Canada. Assn. headquarters, 38 S. Dearborn St., Chicago.

American Gas Assn.—Annual convention, Oct. 15-17, Atlantic City, N. J. Assn. headquarters, 420 Lexington Ave., New York.

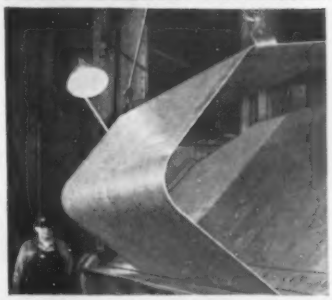
Conveyors Equipment Manufacturers Assn.—23rd annual meeting, Oct. 20-23, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, One Thomas Circle, Washington, D.C.

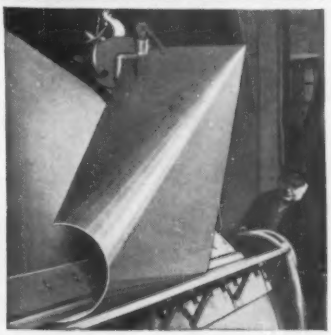
Bending Steel Plates for WELDMENTS?

do it economically with

CHICAGO® POWER BENDING BRAKE

(no dies needed)



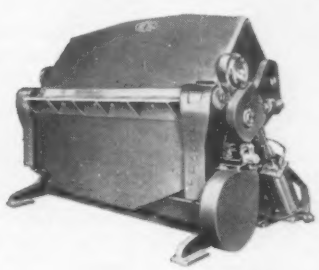


The accompanying illustrations give an idea of the versatility of the CHICAGO bending brake. No dies have to be changed or adjusted—no dies are used on these jobs. Yet, duplication is easily obtained on successive pieces. The machine is quickly adjustable for different thicknesses of material up to rated capacity. Automatic stop regulates the angle of bend. This, too, is adjustable to any degree of bend. The ease of changing from one job to another and the elimination of die costs make the CHICAGO bending brake the economical method for bending steel plates for weldments.

Many standard sizes are available with capacities for bending mild steel up to 12 feet by ¾ inch or 16 feet by ½ inch. Also many standard sizes in hand and power operated models for sheet metal.

BULLETIN P-55
This bulletin gives the details of how these and many other jobs are handled. Also complete description of the machine and specifications of the standard sizes.
Ask for a copy.

Front view of one of the heavy duty models of CHICAGO power bending brake showing the operation end of the machine.



Recommendations for any job on request.

6473

CHICAGO DREIS & KRUMP

Press Brakes • Straight-Side Presses • Press Brake Dies

Hand and Power Brakes • Special Metal-Forming Machines

DREIS & KRUMP MANUFACTURING CO.

7430 South Loomis Boulevard, Chicago 36, Illinois

From one mine . . . one plant . . . and a few Vanadium products, Vanadium Corporation of America now produces over 90 products of Chromium, Silicon, Manganese, Titanium, Vanadium and Aluminum. These include ferro-alloys, metals and chemicals.

We are proud of our growth and our contributions to the Metals Industry. But fifty years of progress is just a beginning, a foundation for better things to come.

To improve our service to customers, we have . . . expanded our integrated system of mining operations . . . enlarged and modernized our milling operations . . . built two new smelting plants; one at Graham, West Virginia, and another at Cambridge, Ohio, to augment production of our Niagara Falls, New York plant . . . started construction of a fourth plant in Jefferson County, Ohio . . . built a research Center at Cambridge, Ohio . . . and recently added a new Pilot Plant.

All this as a foundation on which we will continue to build an increasingly efficient service for you.

To see 50 Years of Progress—Be sure to visit Vancoram Booth #343 at the Metals Show, Cleveland, Oct. 8-12.

VANADIUM CORPORATION OF AMERICA

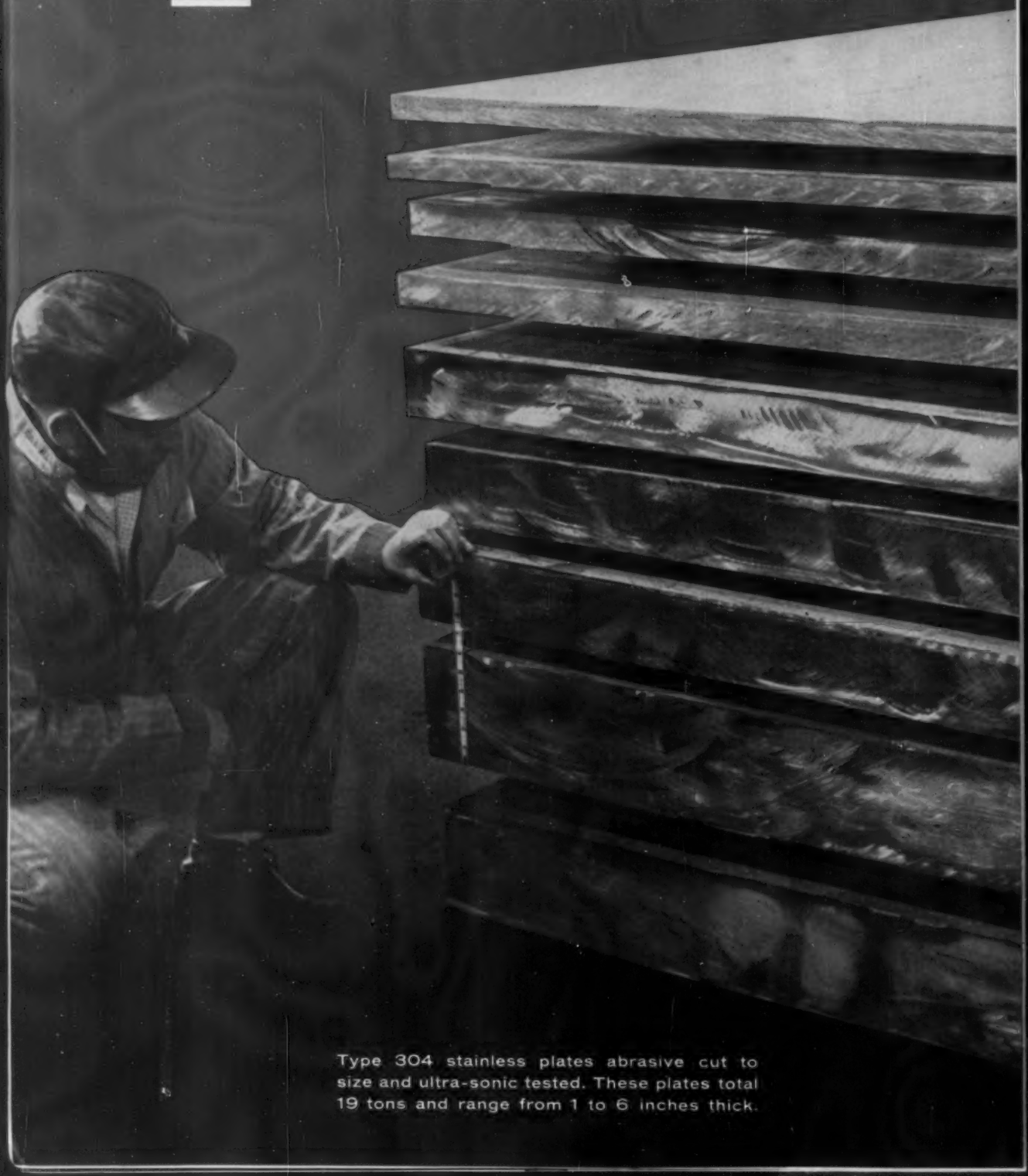
420 Lexington Avenue, New York 17, N. Y. • *Pittsburgh • Chicago • Detroit • Cleveland*

Producers of alloys, metals and chemicals

19 tons of stainless...

all for one customer...

all for atomic power...



Type 304 stainless plates abrasive cut to size and ultra-sonic tested. These plates total 19 tons and range from 1 to 6 inches thick.

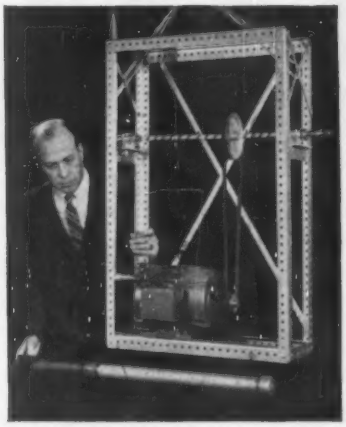
...and all from CARLSON

G.O. CARLSON, INC.

Stainless Steels Exclusively

THORNDALE • PENNSYLVANIA

Motor and Control—
standard ratings now
available for immediate delivery
from warehouses coast-to-coast!



TOMORROW:

A standard motor that can survive infinite heat

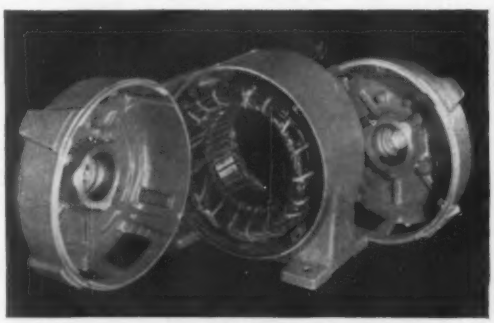
The new Life-Line A is another step closer

Westinghouse is working on tomorrow's motor today. Investigating new materials—testing existing motor designs.

No standard motor today can survive the ultimate test shown here. But we do know that the new Life-Line® "A" can operate under higher temperatures than ever before. It has stronger insulation and better bearing protection than any other motor on the market. It's industry's closest approach to a standard motor that is absolutely heatproof.

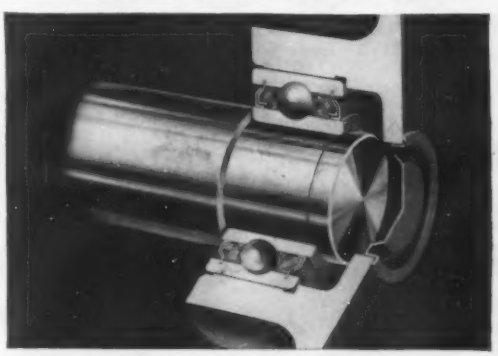
Your Westinghouse sales engineer can show you many additional reasons why the Life-Line "A" is industry's most advanced and preferred motor. Call him today.

21926-A



New fortified insulation includes exclusive Bondar, Bondite and Mylar*—three good reasons why the Life-Line "A" is so resistant to heat or any other motor contamination.

*DuPont Registered Trade-Mark



Two outer seals of new 4-way sealed bearing act as flingers and literally throw off damaging contaminations. Inner seals, attached to outer bearing race, are stationary and form a positive labyrinth.

WATCH WESTINGHOUSE!

WHERE BIG THINGS ARE HAPPENING TODAY!

FLYING PRESS

Just 1 Minute!

You are looking at 60 seconds worth of Wean *Flying Press* production

Over 400 aluminum pie plates, of .002 gage strip, in just one minute! During a demonstration run of the "Flying Press" in the Wean Testing Laboratory, another "conventional press" record fell by the wayside — this time the products were four-inch diameter pie plates, of hard-to-handle .002 gage aluminum strip. The Wean "Flying Press," fitted with the same dies used on the old-type press, nearly quadrupled the normal production limit of 110 per minute.

This bit of magic wasn't done by mirrors — it was the result of an entirely new type of industrial press. The revolutionary Wean "Flying Press" features a continuous-feed design that allows for much greater speed and increased accuracy. It eliminates the clutch and brake which are integral parts of the old intermittent feed presses, and hence reduces press maintenance costs which center largely in these areas.

If you are performing a blanking, piercing, notching or shallow draw operation on either light or heavy gage strip, you can't afford to ignore this revolutionary new press. The first step to adding the Midas touch to *your* balance sheet is to make an appointment for a demonstration of the Wean "Flying Press." Write today — Wean Equipment Corporation, 22800 Lakeland Boulevard, Cleveland 17, Ohio.

On this page are pictured over 400 aluminum pie plates. Those printed in red indicate one minute's production made on conventional equipment. Those in black are the "bonus" the Wean "Flying Press" can provide. A production increase of nearly 300%.

8995

Wean EQUIPMENT CORPORATION

CLEVELAND • CHICAGO • DETROIT • NEWARK, N. J.

Republic Stacking Racks Piston Handling

EASY ENTRY by fork or platform truck is a feature of the PR-15 Stacking Rack. Open construction allows quick identification of stored material. Side and bottom corners are designed to permit stacking to any practical height.

Two Divisions of Thompson Products, Inc., are sharing the benefits of a simplified and speeded-up handling system—the result of using Republic PR-15 Stacking Racks.

Thompson's Light Metals Division produces semi-finished automotive pistons. After inspection the pistons are transported across a yard to the Replacement Division where finished machining is performed. They are then packaged for shipment or moved to a storage area for future use.

Thompson was using a combination of wooden pallets and steel tubs for handling, moving and storing. This involved a great deal of equipment, four separate handling operations, and was costly and time-consuming.

Looking for a way to streamline the operation and cut costs, Thompson contacted Republic. Pooling their knowledge and experience, engineers of both companies worked out the design of the PR-15 Stacking Rack. Republic's Pressed Steel Division fabricated the units.

Besides speeding the entire handling operation and eliminating unnecessary loading and unloading, Thompson has found the PR-15's provide these additional advantages: (1) The racks can be used right at the work benches and machines on the finishing line. (2) Fewer PR-15's can handle the same volume of pistons as the old equipment. (3) Storage space is conserved because design and construction features of the racks permit stacking to any practical height.

Fabricated from tough, strong steel, these units have been in continuous use for over six years—and hold promise of economical service for many more years to come.

Perhaps the PR-15 Stacking Rack is the solution to your handling problem. Or you may require the design of a completely new unit. Our Materials Handling Engineers will help you without obligation. For more information contact your Republic Materials Handling Equipment Representative. Or mail the coupon.

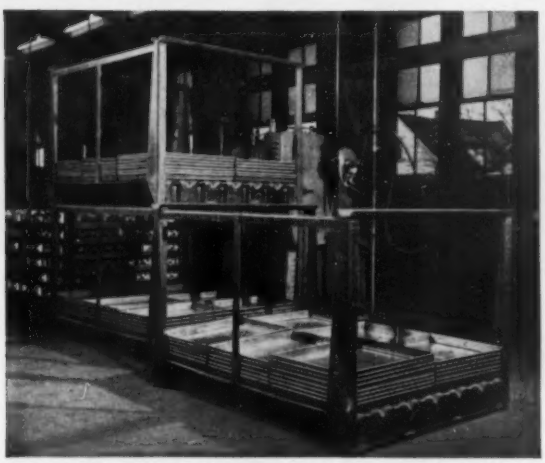
REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

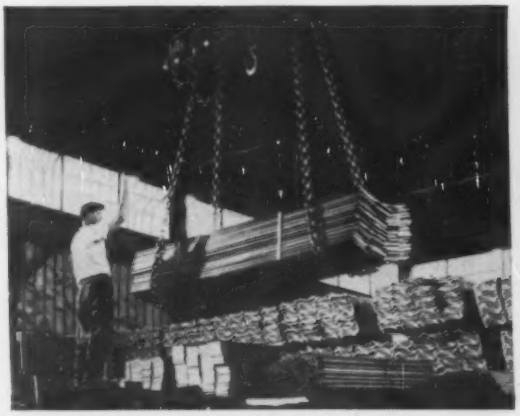
Simplify and Speed at Thompson

AFTER INSPECTION, semi-finished pistons are placed on PR-15's for movement to the finishing line. Note the strong corrugated steel construction of the skid section.



HAVING COMPLETED the circuit from semi-finishing to finishing to shipping or storage, empty PR-15 Racks are stacked up waiting for another load of pistons.

HERE ARE MORE REPUBLIC MATERIALS HANDLING PRODUCTS



CHAIN SLINGS SPEED HANDLING of heavy and hard-to-manage materials. Republic's Bolt and Chain Division makes chain slings in Alloy Steel, High Test Steel and Wrought Iron. All are proof tested and warranted to meet or exceed specifications. Because each type has specific applications, we recommend talking over your requirements with a Republic chain engineer. Send coupon for more information.

STEEL PALLET RACKS made by Republic's Berger Division provide a practical, economical way to palletize and stack bulky, uneven, odd-lot and fragile materials. Tubular steel supports adjust every six inches to handle palletized material of any height. Two-way entry permits loading and unloading from either side. Select single pallets from any level without restacking. Write for complete description, specifications and quotations.

REPUBLIC STEEL CORPORATION
Dept. C-2510
3104 East 45th Street, Cleveland 27, Ohio

☐ Have a Materials Handling Engineer call.

Send literature on the following Republic products.
☐ PR-15 Stacking Racks ☐ Chain Slings ☐ Pallet Racks

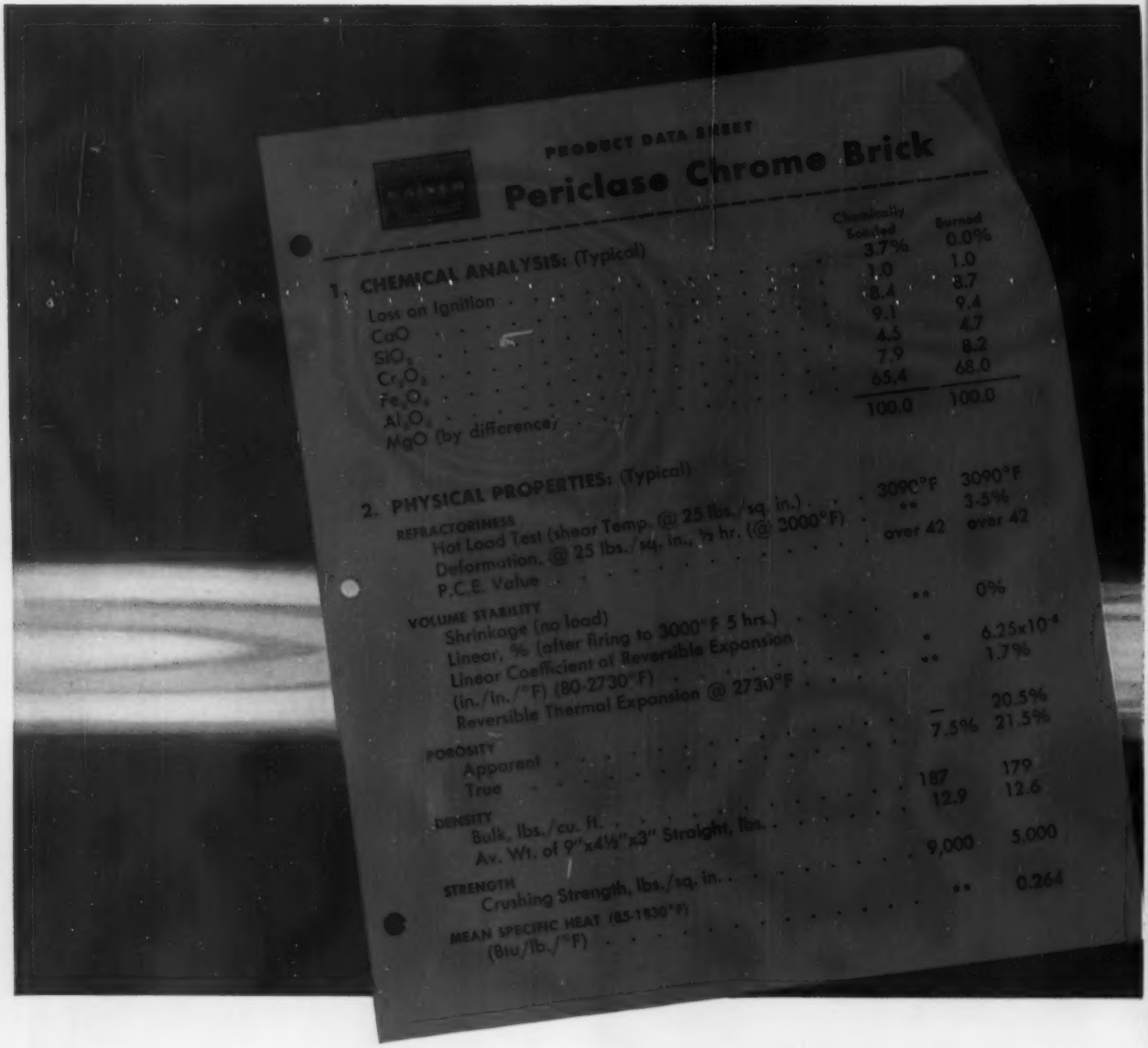
Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

STEEL
and Steel Products


PRODUCT DATA SHEET
Periclase Chrome Brick
1. CHEMICAL ANALYSIS: (Typical)
Chemically Bonded
Burned
Loss on Ignition 3.7% 0.0%
CaO 1.0 1.0
SiO2 8.4 8.7
Cr2O3 9.1 9.4
Fe2O3 4.5 4.7
Al2O3 7.9 8.2
MgO (by difference) 65.4 68.0
100.0 100.0
2. PHYSICAL PROPERTIES: (Typical)
REFRACTORINESS
Hot Load Test (shear Temp. @ 25 lbs./sq. in.) 3090°F 3090°F
Deformation, @ 25 lbs./sq. in., ½ hr. (@ 3000°F) ** 3-5%
P.C.E. Value over 42 over 42
VOLUME STABILITY
Shrinkage (no load)
Linear, % (after firing to 3000°F 5 hrs.) ** 0%
Linear Coefficient of Reversible Expansion
(in./in./°F) (80-2730°F) ** 6.25x10-6
Reversible Thermal Expansion @ 2730°F ** 1.7%
POROSITY
Apparent — 20.5%
True 7.5% 21.5%
DENSITY
Bulk, lbs./cu. ft. 187 179
Av. Wt. of 9"x4½"x3" Straight, lbs. 12.9 12.6
STRENGTH
Crushing Strength, lbs./sq. in. 9,000 5,000
MEAN SPECIFIC HEAT (85-1830°F)
(Btu/lb./°F) ** 0.264

COMPARE THESE SPECIFICATIONS

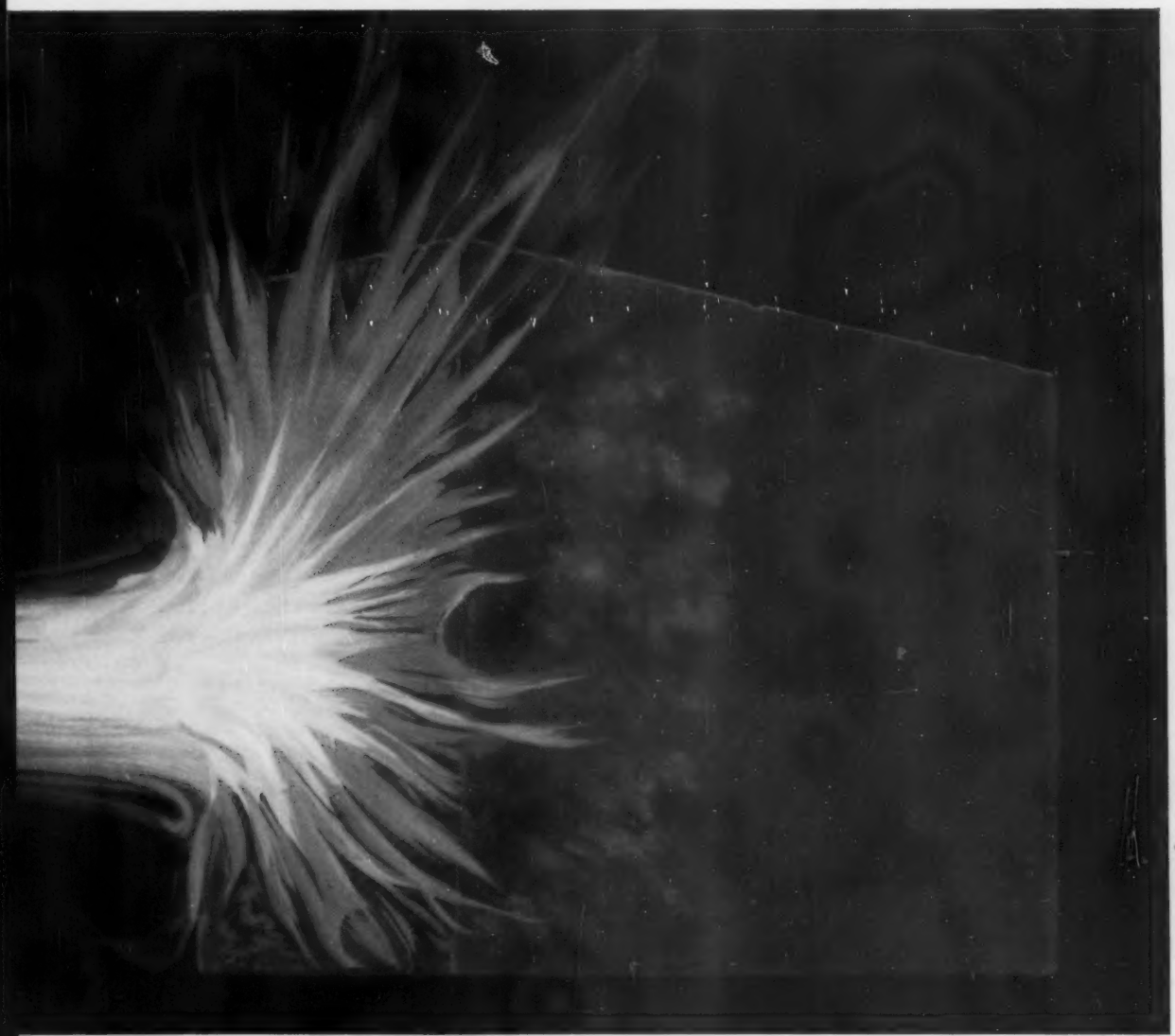
Here's proof that Kaiser Periclase Chrome Brick can give you the longest and most economical end wall service available today!

One quick comparison between the specifications above and those of *any* other end wall brick will tell you why open hearth operators all over the country specify Kaiser Periclase Chrome Brick:

1. Greatly increases end wall life when needed, or
2. Cuts costs with thinner walls, when end wall service is balanced.

This is because the PATENTED composition of Kaiser Periclase Chrome Brick assures you of less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag...

Let your Kaiser Chemicals sales engineer explain how you can take full advantage of Kaiser Periclase Chrome Brick in *your* open hearth. Call or write the nearest sales office listed below for immediate attention to your particular problem.



TO THOSE OF ANY OTHER END WALL BRICK!

More reasons why Kaiser Periclase Chrome Brick gives you better service:

1. Chromite content is the minimum amount (only 9.1% Cr_2O_3) necessary to provide thermal shock resistance. Lowering of chromite reduces swelling, thus minimizes end wall buckling.

2. A ceramic bond is formed *before* the chemical bond is destroyed.

3. No liquid phase in forming its ceramic bond. Volume stable.

4. Highest MgO content in end wall brick provides greater resistance to carryover erosion and iron oxide attack.

5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.

For more information call our nearest Sales Office: Kaiser Chemicals Division, 1924 Broadway, OAKLAND 12, Calif. . . . 3 Gateway Center, PITTSBURGH 22, Pa. . . . 518 Calumet Bldg., 5231 Hohman Avenue, HAMMOND, Indiana.

To obtain free copies of Kaiser Chemicals product literature write Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, OAKLAND 12, California, Dept. S6121.

Kaiser Chemicals

Pioneers in modern basic refractories

REFRACTORY BRICK AND RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

FOR MILLIONS OF GEARS

...Fellows

Fellows Heliguide Hobbing Machine cuts a 37-tooth gear in SAE 4027 carburizing steel on one spindle and a 27-tooth gear on the other. Production, each spindle: 35 gears per hour.

Fellows No. 4GS Gear Shaper cuts twelve 32-tooth, 7″ P.D., ⅜″ face helical gears per hour or seven 15-tooth, 6″ P.D., 2-1/16″ face spur gears per hour. Set-up shown is for 20-tooth helical on countershaft.

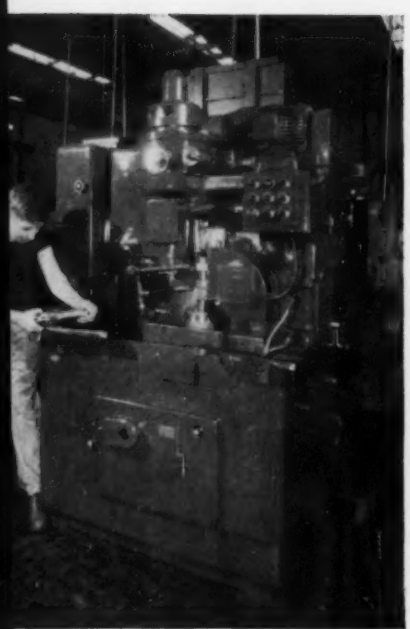
THE PRECISION LINE

A YEAR

Speed and Accuracy!

Over nine million gears a year for truck transmissions and other major sub-contracting jobs are made by the famous New Process Gear Company, Syracuse, N. Y. Their records show that because of their speed and accuracy their new Fellows Gear Production machines have lowered cutting costs by more than half!

For example, the Fellows Heliguide two-spindle hobbing machine at New Process cuts *six times* as many gears per hour as the previous machine. In addition, it saves approximately two hours in set-up time, requires only one operator to watch it because of its easy push-button operation. One man can operate four of these Fellows high-speed Heliguide Hobbing Machines.



New Process gets similar benefits from each of its ten Fellows No. 4GS Gear Shapers. Cutting 30% faster than the old machines, the No. 4GS Gear Shapers also hold to 25% closer tolerance without difficulty, saving on set-up time.

For full information about the complete Precision Line of Fellows Gear Production Equipment, get in touch with your Fellows representative. Write, wire or 'phone any Fellows Office.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices: 319 Fisher Building, Detroit 2
150 West Pleasant Avenue, Maywood, N. J.
5835 West North Avenue, Chicago 39
6214 West Manchester Avenue, Los Angeles 45

Fellows *Gear Production Equipment*

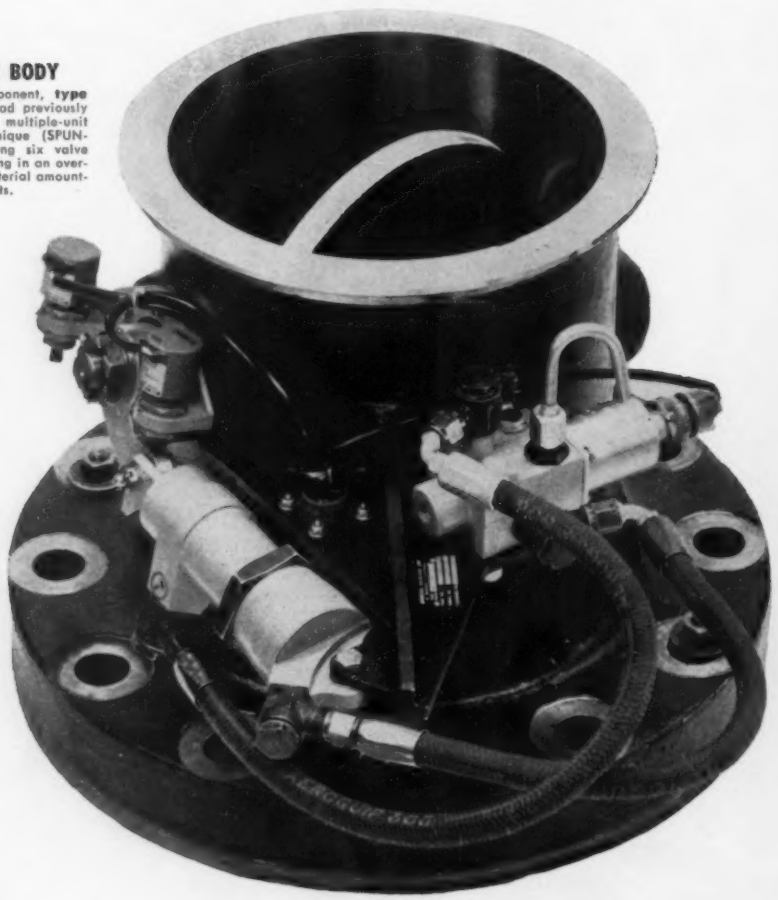
VALVE LINKAGE LEVERS

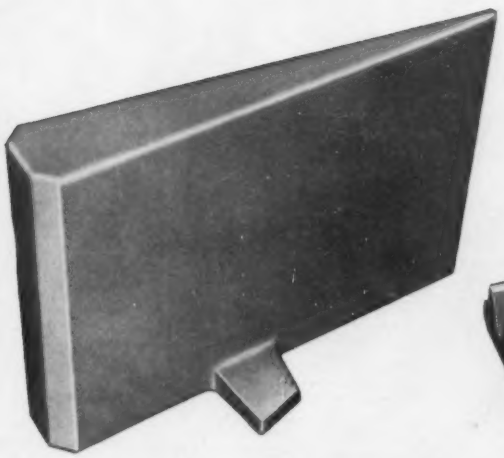
Small parts are no problem. These ESCO SHELLCAST corrosion resistant alloy steel **type 317, A296-49T, CF-8M,** valve linkage levers weigh less than two ounces each.

Before you say, "It can't be cast,"

BUTTERFLY VALVE BODY

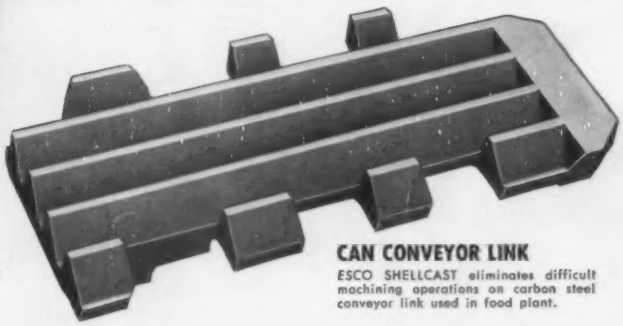
This guided missile component, **type 304, A296-49T CF-8,** had previously been fabricated. ESCO multiple-unit centrifugal casting technique (SPUN-CAST®) was used, casting six valve bodies at one time resulting in an overall saving in time and material amounting to 30% of former costs.





HEAT-TREATING VANE TIP

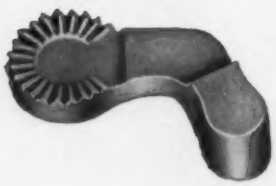
ESCO SHELLCAST in a heat resistant weldable alloy, **type 302B, A297-49T HF,** eliminated all former machining.



CAN CONVEYOR LINK

ESCO SHELLCAST eliminates difficult machining operations on carbon steel conveyor link used in food plant.

call an *ESCO* Engineer...



ESCO alloy steel castings can make your designing *easier*. You get the part you want, in the alloy you need and in the shape that saves you the most fabricating, machining and finishing time . . . ***PLUS***

METALLURGICAL ENGINEERING AND RESEARCH

ESCO maintains one of the largest and best equipped metallurgical staffs of any alloy steel foundry . . . ***PLUS***

PRODUCT ENGINEERING AND DESIGN

An integrated service at all levels; in the field, at the drawing board and in the foundry . . . ***PLUS***

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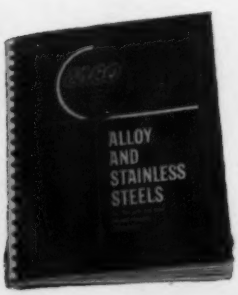
A casting service that covers the complete range of alloy steel casting methods for all applications . . . ***PLUS***

LABORATORY INSPECTION AND TESTING

ESCO laboratory technicians are qualified and equipped to perform all types of inspections and testing to the most rigid specifications.

Write today for your FREE copy of this informative 100-page reference book—"ESCO Alloy and Stainless Steels for the Process and Manufacturing Industries".



Call an *ESCO* Engineer — let him show you how *ESCO* Alloy Steel Castings can help make your designing easier.

ELECTRIC STEEL FOUNDRY COMPANY

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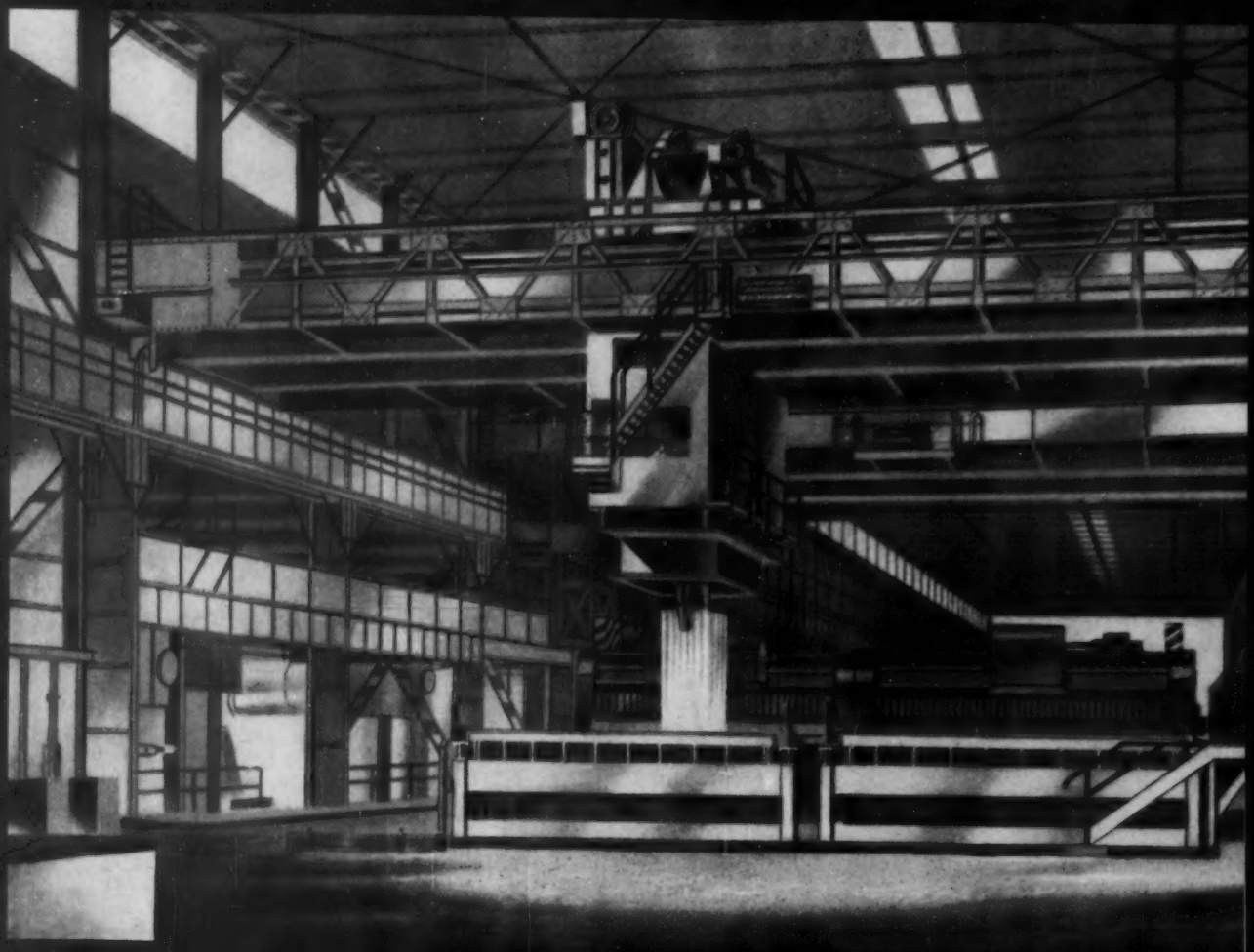
1017 Griggs Street Danville, Illinois

ESCO International and Eastern Sales:
420 Lexington Ave., New York City, N.Y.

Other Offices and Warehouses
Los Angeles, San Francisco, Calif.; Seattle, Spokane, Wash., Salt Lake City, Utah; Denver, Colo.; Houston, Texas; Eugene, Ore.; Centralia, Pa.; Honolulu, Hawaii.

In Canada, ESCO Ltd. Manufacturing Plants
Vancouver, B.C. and Toronto, Ontario.

INTENSIFIED GRIP...



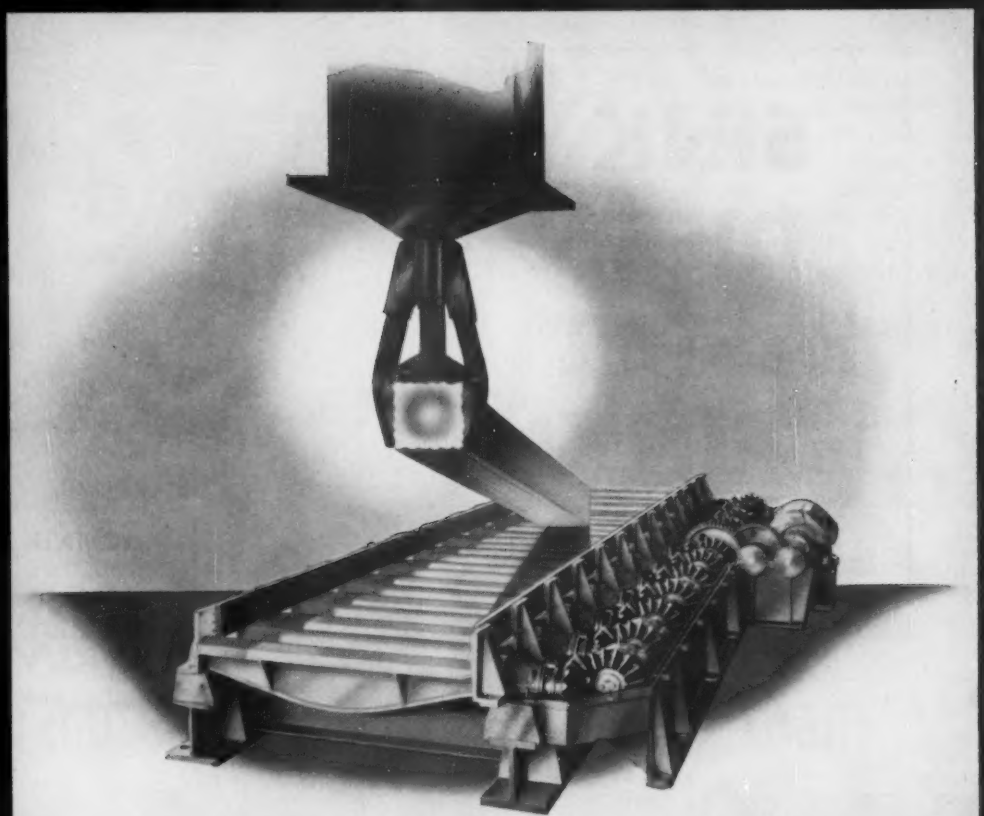
The tong grip of the conventional soaking pit crane depends *solely* on the weight of the ingot and when the weight of the ingot is removed, as in the case of placing an ingot on an approach mill table, the grip is reduced to zero and the ingot drops.

The tongs' grip of the Alliance intensified grip soaking pit crane is produced by the weight of the column *plus* the weight of the ingot. Since the weight of the column is usually equal to the weight of the ingot, the intensified grip soaking pit crane has the same grip *without* an ingot in the tongs as a conventional soaking pit crane has with an ingot, and *twice as much grip* as the conventional soaking pit crane when handling an ingot.

These intensified grip soaking pit cranes are built to handle ingots of any size and weight and incorporate all modern safety features. We welcome the opportunity to assist in solving your material-handling problems.

THE ALLIANCE MACHINE COMPAN

for Soaking Pit Cranes



The intensified grip soaking pit crane was developed by The Alliance Machine Company to hold ingots more firmly in the tongs and prevent dropping of ingots when they are placed on the mill approach table, ingot chariot or in the soaking pits. This is an exclusive Alliance feature.

Alliance

LADLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES • STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION

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SINK DIES FASTER in FINKL Die Blocks with

Machining time, such as planing, rough cutting, milling, hand benching and burring are appreciably reduced on Finkl SMQ Die Blocks. Thorough field testing shows that the Special Machining characteristic of SMQ saves shop time and gets the die into production sooner.

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JOB-RATED Type "C" DISC

The sensational new 3M Type "C" Disc is stronger, sharper and longer-cutting than any other disc of its type on the market today. It's *shape-controlled* and *job-rated* (for edge sanding, flat sanding or solder sanding) to fit your specific operations. It's the top quality disc that eliminates problems of disc cupping and breaking—assures you highest consistent performance.

NEW... from 3M COMPANY Research

a portable metal grinding and finishing team

PORTABLE "PG" WHEEL

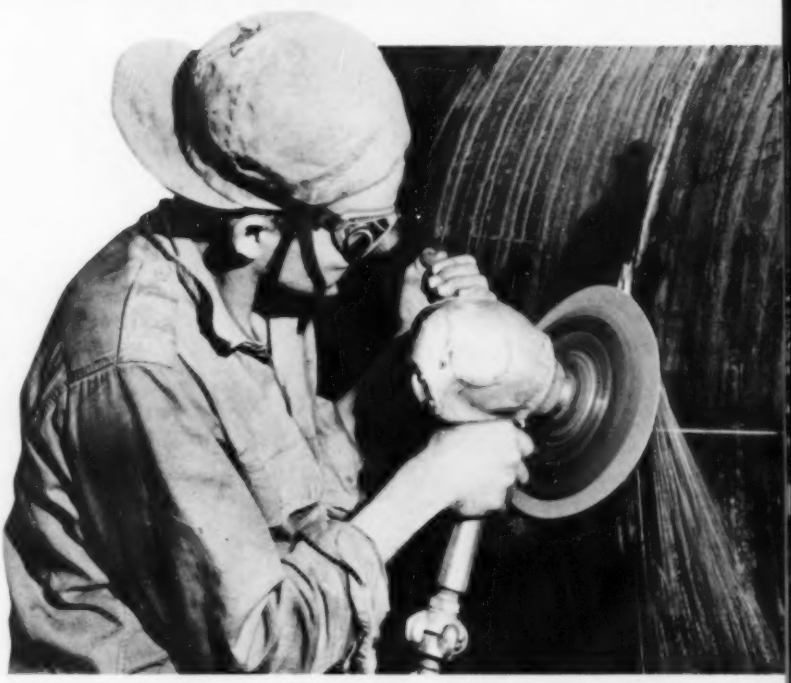
The amazing new portable "PG" Wheel is the finest, most revolutionary, metal-polishing tool available—designed to replace set-up wheels, felt wheels, rubber bonded polishing wheels, greaseless compound wheels. It's *self-conforming* to curves and contours . . . retains its shape *throughout* its working life . . . needs no breaking in or dressing. It cuts costs, increases production, improves finishes.

3M's NEW PORTABLE TEAM

JOB-RATED
Type "C" Disc

SHAPE-CONTROLLED—amazing new treatment during manufacture gives new 3M Type "C" Discs the best resistance to effects of humidity and temperature of any disc in the world (see chart, overleaf).

JOB-RATED—new 3M Type "C" Discs are now job-rated for specific work . . . edge sanding . . . flat sanding . . . solder sanding or oil filling operations. This advance results from 3M's pre-eminent position in quality control. New controls on fibres—constant improvements in resins—are just two of the factors making it possible. Most important, in shape-controlling *and* job-rating is 3M's miraculous new coated abrasives making machine—the world's largest and most modern—which controls quality to a degree impossible to equal elsewhere.



Shown in picture above is the amazing new 3M Type "C" Disc at work on a hot-rolled high tensi steel transport tank at the Standard Steel Works, Kansas City, Missouri. Here, a test was conducte on weld grinding performance of the new "C" Disc, Grit #36 vs. performance of a standard "C" Dis Grit #36. Results: the new 3M Type "C" Disc removed stock 25% faster—lasted 10%-15% longe

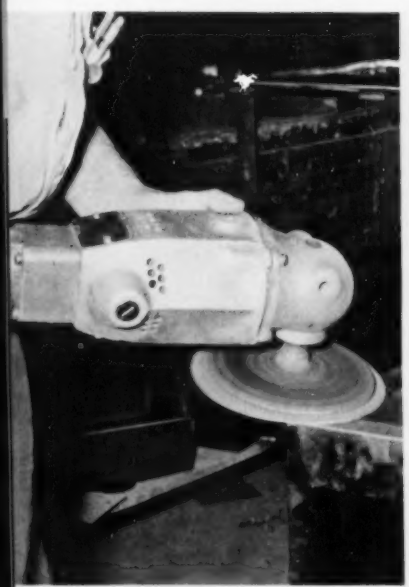
Shown above, the remarkable new portable "PG" Wheel is blending a weld on a stainless steel dairy tank at the Standard Steel Works, Kansas City, Missouri. Here the weld is to be blended with a #4 finish on the tank (shown covered by a protective tape). Formerly, this manufacturer was using set-up wheels for this operation—found them slow, unsatisfactory. The portable "PG" Wheel increased production —did a better blending job than was ever before possible.

PORTABLE
"PG" WHEEL

PORTABLE—this smaller version of the standard "PG" Wheel is a remarkable new metal-polishing tool, ideally suited for both portable and bench grinding machines. Formed of die-cut segments of cloth-backed 3M Coated Abrasive, bonded with resin and locked into a hub.

SELF-CONFORMING—the new portable "PG" Wheel makes filling a problem of the past because its coated abrasive cannot become filled. The mineral grains *and* backing wear away together—conforming to the shape being polished—and presenting an always new surface to the work. The portable "PG" Wheel is perfect for rust or dirt removal, blending disc-sander patterns, weld polishing, metal-feather edging *and* soft-metal polishing, tar-grinding or removing runs and sags on fibre glass.

obsoletes other metal grinding and finishing methods with far greater speed and savings like these ▬ ▬ ▬



EDGE SANDING welded corners of steel cabinet units with the *new* 3M Type "C" Disc. The Underwood Company, Pittsburgh, Pennsylvania, finds that Grit #60 "C" Discs provide fast cut-down of excess weld metal, leave moderate scratch pattern for easy matching to a standard #4 finish on the unit.

FLAT SANDING welds on steel refrigerator cabinets with *new* 3M Type "C" Disc at Midwest Manufacturing Corp., subsidiary of Admiral Corp. Manufacturer finds *new* "C" discs tailor-made for his moving line operation —finds too, that down-time for disc-changing is cut to a minimum.

SOLDER SANDING and weld grinding on various areas of assembled funeral caskets. The Cincinnati Coffin Company, Cincinnati, Ohio has found that the new job-rated "C" Discs cut faster—fill less—and last up to 50% longer than the discs they had previously used for these operations.

FLEXIBLE SHAFT refinishing of used aluminum aircraft propeller blades with a portable "PG" Wheel. American Airmotive Corp., Miami, Florida finds the "PG" Wheel ideal for restoring blade finish. The "PG" Wheel outlasts the set-up wheels previously used by a ratio of 20 to 1—*and* works faster.

FIXTURE-HELD FLEXIBLE SHAFT blending of inside diameter of steel turbine center with a Grit #120 portable "PG" Wheel. Twin Disc Clutch Co., of Rockford, Illinois, found the new "PG" Wheel ideal for this operation as it conforms itself to follow the contour of the turbine center —performs the blending operation in one pass.

BENCH GRINDER polishing of farm machine part with a Grit #150 portable "PG" Wheel. Minneapolis Moline Co., Minneapolis, Minn., had difficulty removing sharp edges—parts' shape made set-up wheel or belt polishing hard. "PG" Wheel cuts, polishes in 1 operation *and* conforms to forgings' small radius.

In the above pictures, protective guards have been removed for photographic purposes

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In the above pictures, protective guards have been removed for photographic purposes

SPECIFICATIONS

Job-rated, shape-controlled 3M type "C" DISC

PRODUCT OF 3M RESEARCH

	15% relative humidity	45% relative humidity	60% relative humidity
OLD Type Discs	5.0	2.0	1.8
NEW 3M Type "C" Discs	2.5	0.5	0.0

3M Portable "PG" WHEEL

PRODUCT OF 3M RESEARCH

Wheel Diameter	Grits	Width	Recommended Speed—RPM
6"	50 thru 320	1-1½-2-2½-3	5,000
7"	"	"	4,500
8"	"	"	4,000
9"	"	"	3,500
10"	"	"	3,000
11"	"	2-2½-3	3,000

3M® ABRASIVES

Made in U.S.A. by MINNESOTA MINING AND MFG. CO., General Offices: St. Paul 6, Minn. In Canada: P.O. Box 757, London, Ontario. Export Sales Office: 99 Park Avenue, New York City. Makers of "Scotch" Brand Pressure-Sensitive Tapes, "Scotch" Brand Magnetic Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing.

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Dept. AK-96, St. Paul 6, Minn.

- ☐ Rush me full facts on the new job-rated, shape-controlled "C" Disc
- ☐ Rush me full facts on the new portable "PG" Wheel
- ☐ Please have a 3M Representative call

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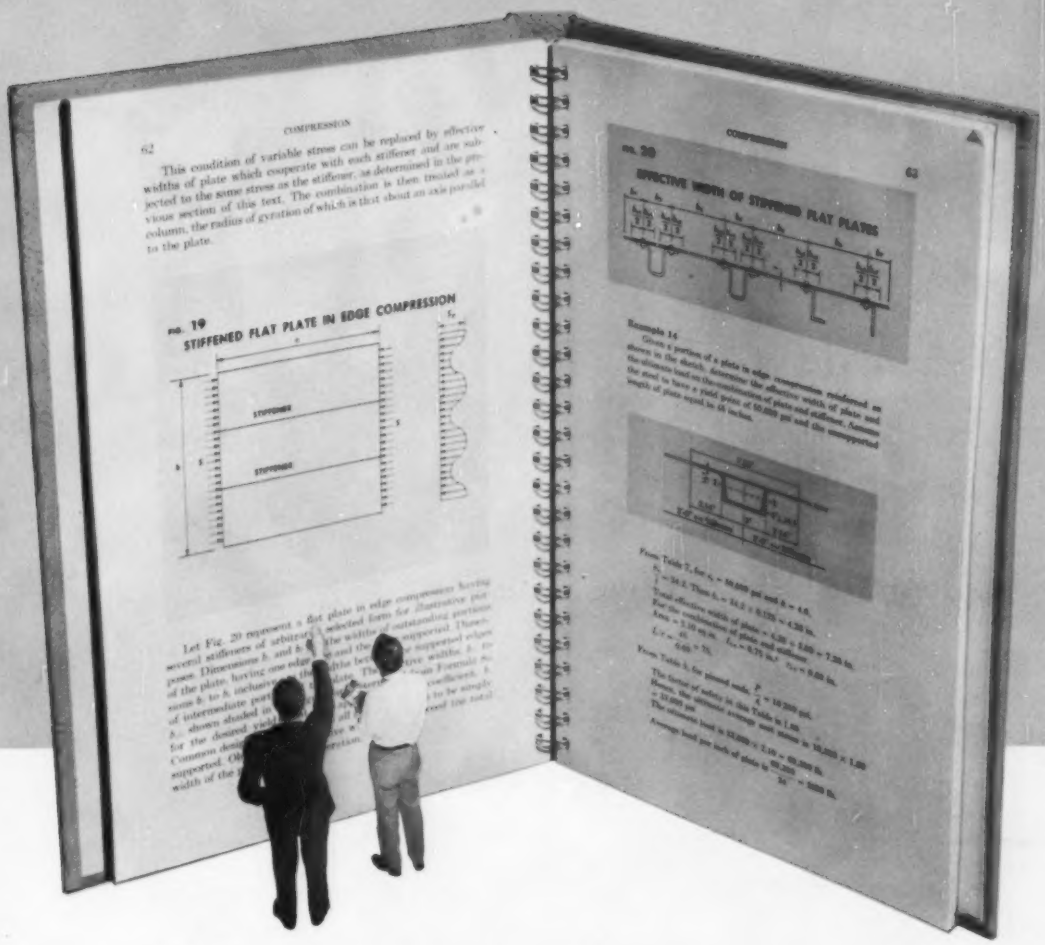
62 COMPRESSION
This condition of variable stress can be replaced by effective
widths of plate which cooperate with each stiffener and are sub-
jected to the same stress as the stiffener, as determined in the pre-
vious section of this text. The combination is then treated as a
column, the radius of gyration of which is that about an axis parallel
to the plate.
FIG. 19
STIFFENED FLAT PLATE IN EDGE COMPRESSION
STIFFENER
STIFFENER
COMPRESSION
FIG. 20
62
EFFECTIVE WIDTH OF STIFFENED FLAT PLATES

You'll find it all here . . .

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OUR new "Design Manual for High Strength Steels" is ready for distribution. Here are 174 pages of practical, authoritative information that you will find invaluable in designing your product for greater economy and efficiency by the sound use of high strength steels. No designer should be without it.

This excellent book covers in detail the problems of tension, compression, shear, beam stress, deformation and deflection. It fully describes the fundamental characteristics of low-alloy high strength steels, shows you how to design against corrosion, describes the application of formed sections. Complete with tables, formulas, and basic data covering this important field of design.

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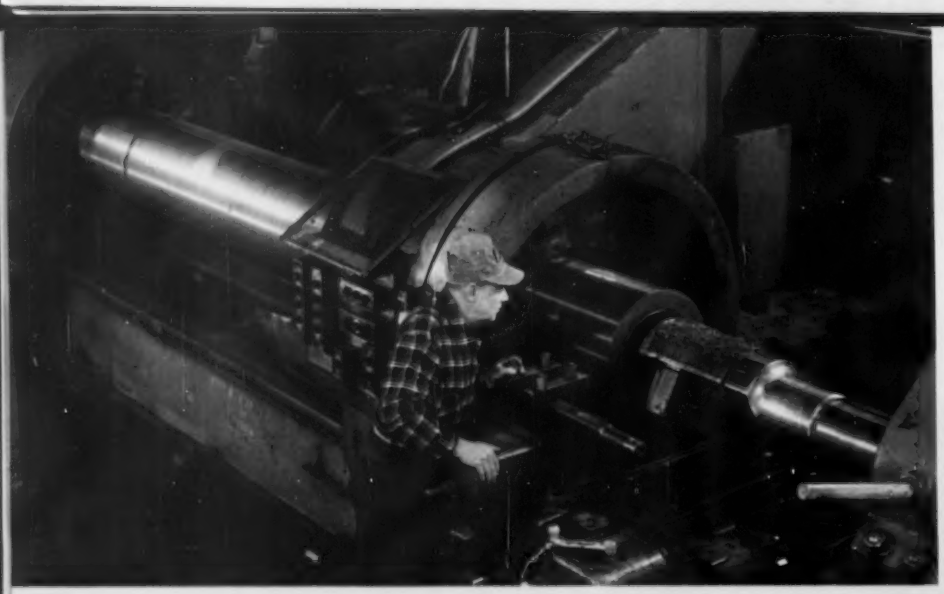

Roll is shown at Homestead Forgings Division of United States Steel being bored, prior to heat treatment and reaming. Machine is 48" center drive, double end boring lathe.

Glass melting tank is at left. Forged Stainless rolls squeeze the viscous glass between them before it enters annealing lehr. ▼

PPG rolls glass at 2000°F with USS Stainless Steel rolls

In a sizzling race to keep up with the demand for flat glass, Pittsburgh Plate Glass Company is rapidly building new factories and increasing the output of old ones. But you cannot increase the output of an existing factory unless you can somehow get more glass from the melting tanks.

Since plate glass must pass between a pair of rolls as it emerges from the tank, the rolls must turn faster when production is increased. If they turn faster, it is more difficult to dissipate the heat from the molten glass. The answer is better rolls. And when you're thinking in terms of better rolls for hot work, stainless steel forgings are the answer.

Pittsburgh Plate has found that USS Quality Forging rolls have suitable physical properties and microstructure that are so necessary for this job. They are made from Type 410 Stainless Steel, and are remarkably resistant to surface cracking and checking. The rolls are water cooled internally, and there is naturally a steep temperature gradient from O.D. to I.D. The forged rolls resist pitting and oxidation. They retain their dimensions during the 24-hour-a-day glassmaking process.

Pittsburgh Plate has had one set of these rolls in continuous service for two years, and they have already produced *millions* of square feet of glass. Similar rolls will also be installed in their revolutionary new Cumberland, Md. plant.

Write today for our free booklet that describes USS Quality Forgings. Address inquiries or requests for the booklet to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

USS QUALITY FORGINGS

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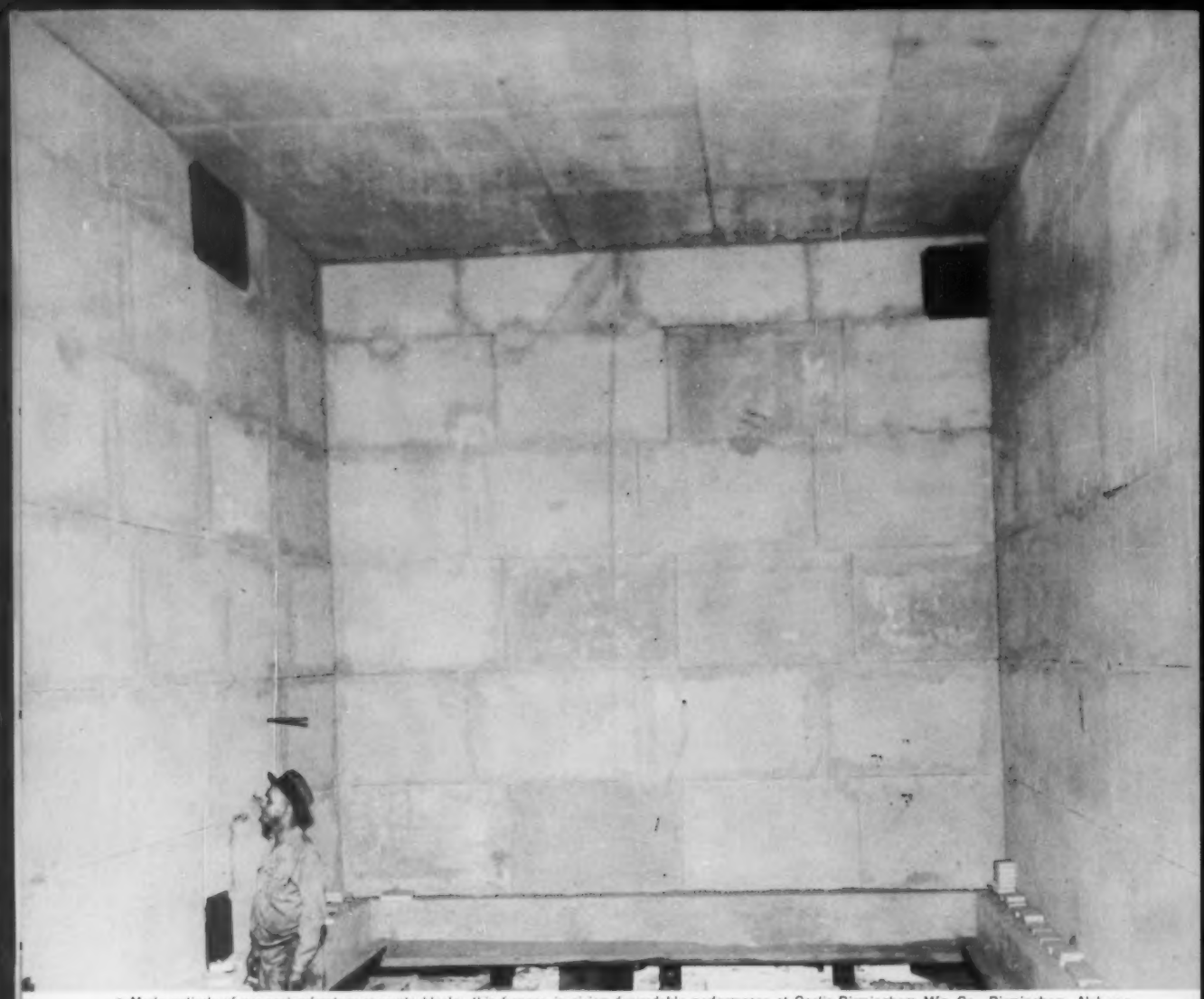
heavy machinery parts—carbon, alloy, stainless
forged steel rolls and back-up roll sleeves
electrical and water wheel shafts
specialty forgings of all types

UNITED STATES STEEL



• Made entirely of pre-cast refractory concrete blocks, this furnace is giving dependable performance at Goslin-Birmingham Mfg. Co., Birmingham, Alabama.

Pre-cast blocks of Lumnite*-made concrete give excellent service in big furnaces

• Lumnite can take it. These big castings ride on car top made with Lumnite refractory concrete.

"This furnace was built for stress-relieving gray iron castings, and steel weldments. We encountered no difficulty in casting or erecting pre-cast blocks, of which entire furnace was constructed. It has operated with minimum trouble and is very satisfactory," reports Mr. A. W. Varnon, Plant Superintendent of Goslin-Birmingham Mfg. Co.

Furnace linings made with pre-cast refractory concrete blocks, or cast monolithically, can save time and money in your plant, too. Construction is fast and easy, with Lumnite calcium-aluminate cement, or Lumnite-base castables. Just pour refractory concrete in simple wooden forms. Lumnite reaches service strength within 24 hours.

Keep a supply of Lumnite cement or Lumnite-base castables on hand for other time- and labor-saving uses around your plant. You can make refractory concrete *designed for your specific job* by just adding water to a factory-prepared castable mix. Castables are made and distributed by leading manufacturers of refractories.

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UNITED STATES STEEL (USS) CORPORATION SUBSIDIARY
100 PARK AVENUE, NEW YORK 17, N. Y.

*"LUMNITE" is the registered trade-mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company

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Chicago Rivet & MACHINE CO.

lower tool costs . . . get quality rivets with KEYSTONE WIRE

Tubular rivet manufacture by the cold heading extrusion process is one of the most difficult cold forming operations. The combination of a hollow punch operation plus an extreme upset makes it difficult to hold a uniform outer shell. A smooth finished appearance is necessary because rivets many times are visible in the finished products.

Chicago Rivet & Machine Co., Chicago, Illinois, has frequently consulted with Keystone Metallurgists when difficult forming problems confronted them. As a result, the right Keystone Tubular Rivet Wire has been successfully applied in the manufacture of the many intricate rivets produced by this company. They report increased die life and a higher quality finished product.

The fine *flowability* characteristics of Keystone Tubular Rivet Wire lower costs, reduce rejects and produce precision fasteners more efficiently. A Keystone Wire Specialist will gladly analyze your needs. Your inquiry is invited!

Keystone Steel & Wire Company, Peoria 7, Illinois

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up in the clouds...

When a Navy Training Plane points its nose skyward in defiance of gravity, everything from tip to tail must be a model of precision and endurance. Federal Ball Bearings are here, too, in the flexible drive assembly of this Lear actuating screwjack, which helps raise and lower the pilot's seat.

or down the lane!

Bowlers call it magic, the way the AMF Automatic Pinspotter sets 'em up—even replaces "off-spot" pins in their exact location after every roll. Federal Ball Bearings do their part in the gear boxes of these mechanical marvels.

so much of industry *turns* on FEDERAL ball bearings

Pilot's comfort or bowler's score. Production manager's quota or housewife's cake. All are important to those who design and build so many of the thousands of tools, machines and household appliances —with Federal Ball Bearings. 12,000 sizes. Hundreds of types. Produced by this 50-year-old manufacturer of ball bearings, *exclusively.*

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Formbrite cuts polishing cost 50% for Flexscreen®

Bennett-Ireland, Inc., drops cutting operation completely, speeds buffing—finds Formbrite also gives a more attractive, scratch-resistant finish.

This frame and the fender at bottom of page, both of Formbrite, are components of the Flexscreen ensemble shown above—one of many models manufactured by Bennett-Ireland, Inc.

Bennett-Ireland, Inc., Norwich, N.Y., previously used ordinary drawing brass for hearth fenders, kerbs, and frames in their famous flexible-metal fireplace screen ensembles. In polishing, the production rate was 12 frames per hour for the cutting operation and 4.5 frames per hour in the buffing operation.

When Bennett-Ireland changed to Formbrite*, they found they could drop the cutting operation completely. And Formbrite's superior fine-grain finish speeded the buffing rate to 6.8 frames per hour. Thus the unit polishing costs for the frames were cut 50 per cent.

Bennett-Ireland also found that Formbrite forms readily with no rejections and that it resists scratching during forming and handling. The end result is a product with superior eye-appeal that will remain beautiful in the home through the years.

See for yourself: Formbrite is a premium product at a nonpremium price. Find out for yourself how its superfine grain, excellent drawing properties, strength, and scratch resistance can help you make a better product at lower cost. Write for Publication B-39. Better still, ask about a sample or a trial batch. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 5665

*Reg. U.S. Pat. Off.

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SUPERFINE-GRAIN DRAWING BRASS
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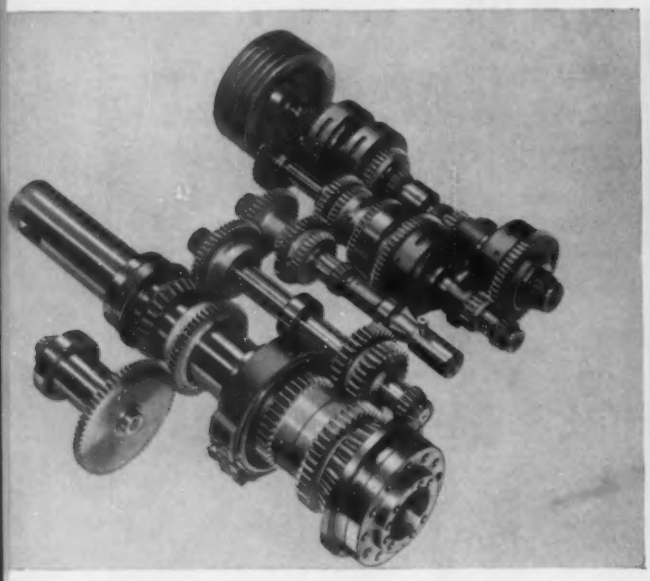


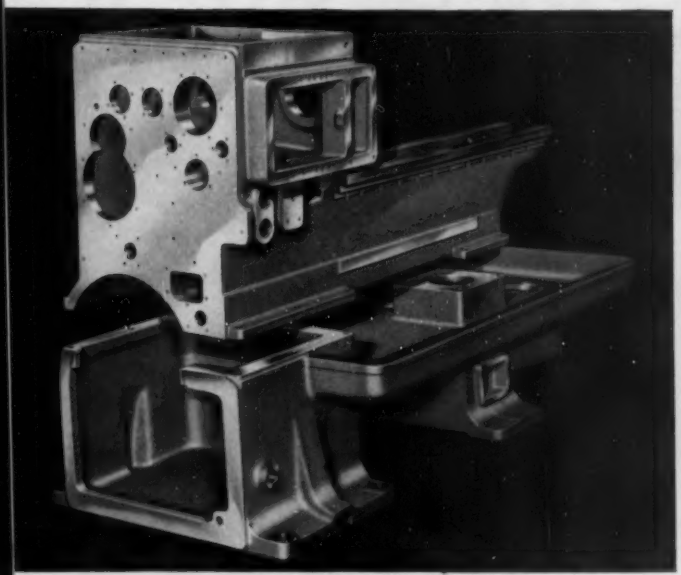
NEW HEADSTOCK GEAR TRAIN—sixteen different spindle speeds available, powered by up to 30 h.p. single-speed driving motor delivering full power at all speeds. Spindle is mounted on selected pre-loaded, precision-tapered roller bearings. Heavier, more rugged design provides smoother, quieter power.

HYDRAULIC SPEED SELECTOR—smooth, effortless speed changes. No waiting, no computing, no stopping of spindle, no releasing of main drive clutch. Operates direct or pre-set. Hi-Lo Lever permits instantaneous speed changes in 8:1 ratio without moving Speed Selector handwheel. Multiple Disc Clutches have automatic take-up for wear.

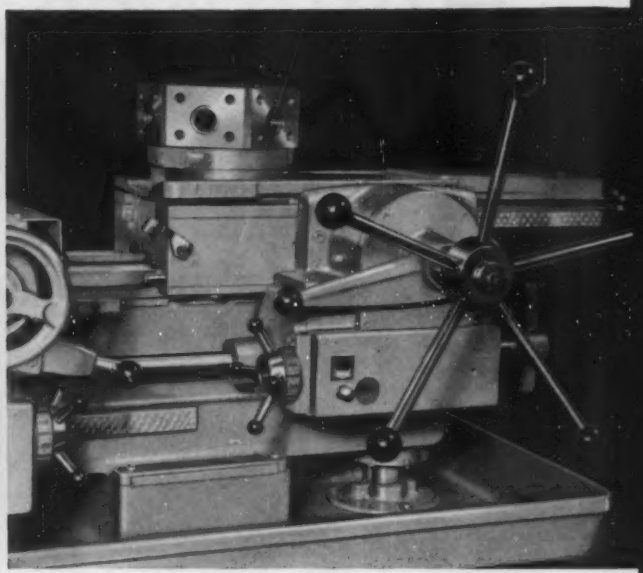
YOU GET THEM ALL...PLUS

NEW GISHOLT MASTERLINE

WANT HEAVY CUTS WITHOUT VIBRATION?



NEW HEADSTOCK AND BED CASTING—scientific design dampens out vibrations, assures smooth operation and simplifies holding closer tolerances. Made from semi-steel, poured in Gisholt's own foundry. Greater swing over ways permits bigger chucks and broader range of workpiece sizes. Provides a solid foundation for all types of work.



NEW TURRET RAM AND SADDLE—designed wider, heavier, more rigid to handle increased capacity and higher speeds. Dial-type feed selector makes feed changes faster, easier. Turret ram rigidly supported on 64-66 Rockwell C alloy steel way strips. Power transmitted through serrated tooth clutches, with shear pin protection against overloading.

GREATER VERSATILITY...WITH THE

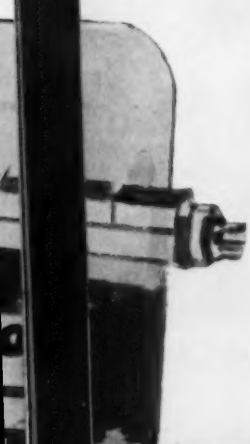
RAM TYPE TURRET LATHE

YOU'LL SPEED UP your production jobs—both large and small—with this more powerful, more versatile Gisholt MASTERLINE Ram Type Turret Lathe.

Here is a machine designed from end-to-end for easier setups, faster change-over and higher productive output than ever before. Check the advanced features illustrated above. Note the reserve power to handle your heaviest cuts—and to meet your tooling requirements of tomorrow. Note the extra spindle speeds—all at your operator's finger tips, without computing—for faster, better turning of any type material. And look over the new massive design, the over-all ruggedness that permits greater accuracy, closer tolerances, deeper cuts at punishing feeds without vibration.

Find out now how this powerful, flexible Gisholt MASTERLINE Ram Type Turret Lathe can reduce floor-to-floor time on your specific jobs. Call your Gisholt Representative today—let him show you how this advanced machine can fit most profitably into your production picture. Or write direct to Gisholt for the new literature described below.

READY NOW—all-new, 18-page illustrated Bulletin No. 1174-B, covering features, accessories, tools and floor plans on new Gisholt MASTERLINE Ram Type Turret Lathes. Ask for it!



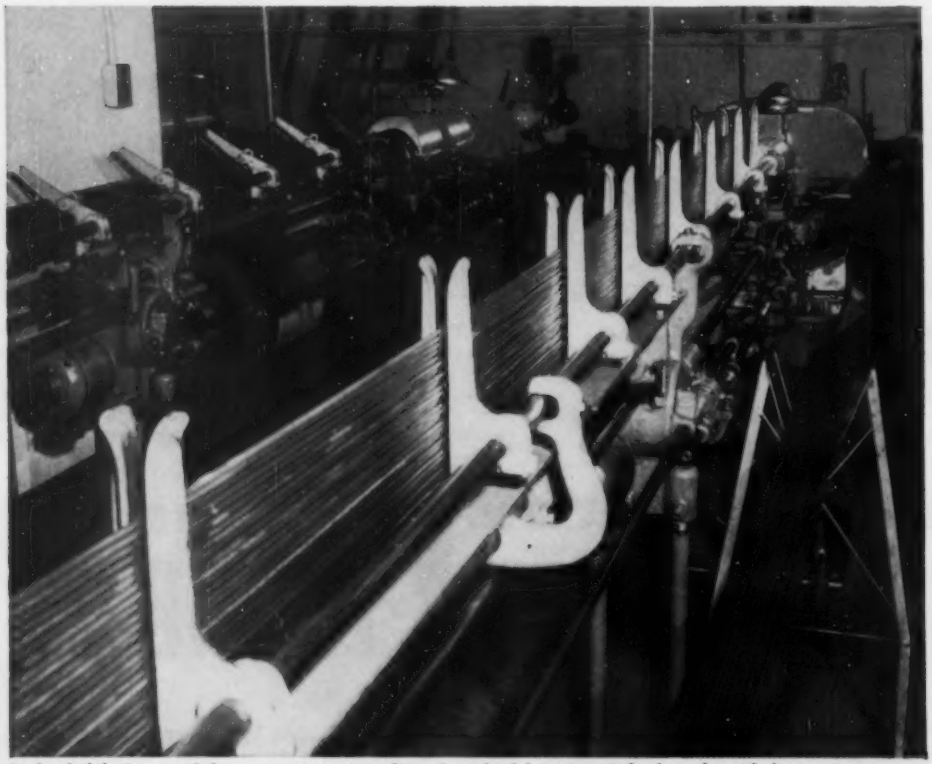
GISHOLT MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

How "MASTER" put a

USS Amer-Led hikes



Feed end of the Brown and Sharp automatic screw machines. A couple of dozen Amer-Led rods can be stacked at one time.

Business end of the screw machines. Increased production was most noticeable here, where shackles are cut, formed and drilled.

Broaching is performed on this Zeh and Hahnemon toggle press. Tool life is much greater since use of Amer-Led.

padlock on costs...

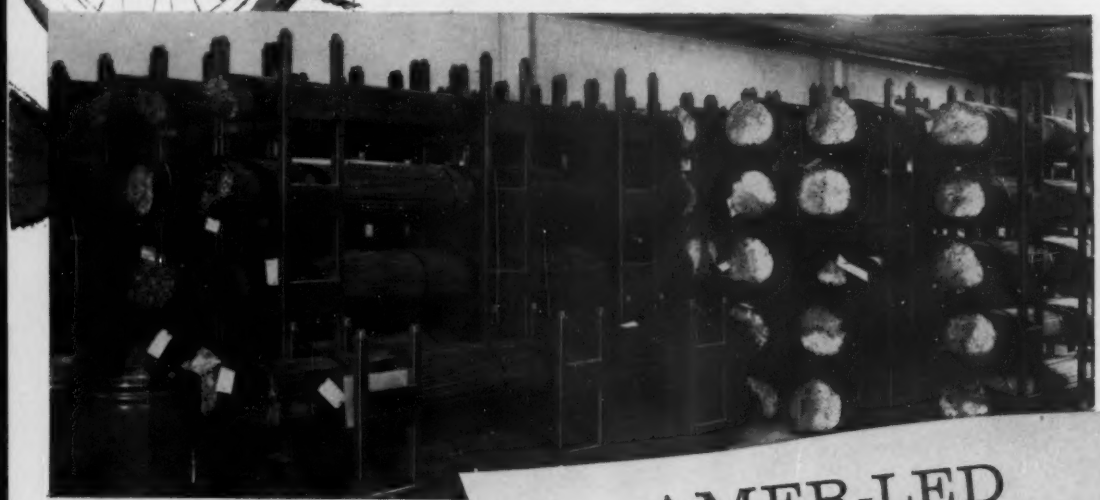
production 25% to 75%

When American Steel & Wire first developed Amer-Led free machining stock, it was suggested to Master Lock and it worked like a charm. Automatic screw machine production leaped 25% to 75% without any increase in tool wear! The finer grain structure of this new steel permitted more accurate cutting to closer tolerances, and there were fewer rejects, too.

Punch press production increased 15% to 20%, and was limited only by the ability of the operator to feed the machine. Although production was not increased in the broaching operation, tool life was increased.

Of course, this is the story of Master Lock Company. If *you* yearn for results like this, then get in touch with your AS&W representative. Ask about USS Amer-Led.

Schoolboys can identify a "Master" padlock with its unusual laminated steel case. The shackle is possibly the most important part. Miscreants try to twist it off with a crowbar, or sever it with hacksaw or rasp. Obviously, the shackle must be hard and free from brittleness after heat treatment; and during production it must be ductile and machinable.



The Amer-Led is stored as received—in steel strapped bundles. There's a type for most machining operations.

AMERICAN STEEL & WIRE
DIVISION, UNITED STATES STEEL
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

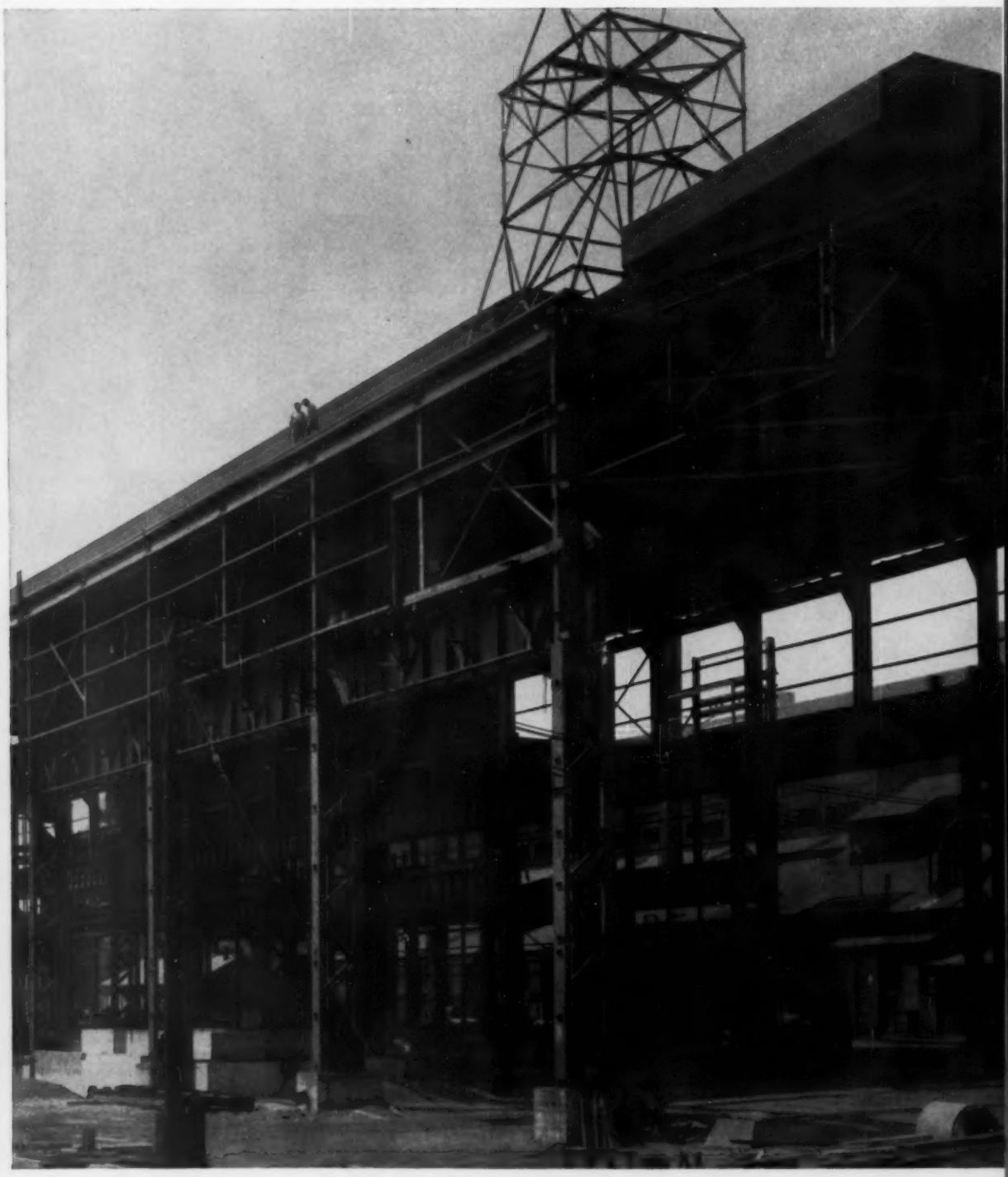
AMER-LED
SUPER-MACHINING
BARS

USS

UNITED STATES STEEL

SHARON STEEL'S NEW

fabricated and erected by



BLOOMING MILL BUILDING

AMERICAN BRIDGE

The structural steel for the big blooming mill at Sharon Steel's Roemer Works, in Farrell, Pa., was fabricated and erected by American Bridge.

In all, American Bridge put 3,000 tons of structural steel into this interesting new mill building, including crane runways, transmission towers, all sheds, shops and bins, as well as installation of overhead cranes, machinery and building foundations, and all sewer and water lines. And, the finished job will be as modern as you'll find anywhere!

What we have done for Sharon Steel, we can do for you. When business dictates expansion and you need new buildings to carry through your plans, call in American Bridge. We shall be glad to discuss in detail our ability to serve you. Contact the nearest office or write direct to our Pittsburgh headquarters.

AMERICAN BRIDGE ..... *General Contractor*

OTHER CONTRACTORS:

ALLIANCE MACHINE CO. ..... *Overhead Cranes*
GENERAL ELECTRIC CORP. ..... *Electrical Equipment*
F. H. McGRAW ..... *Mechanical Installation*
NATIONAL VALVE & MFG. CO. ..... *Piping Installation*
PATTERSON-EMERSON-COMSTOCK ..... *Electrical Installation*
SURFACE COMBUSTION CORPORATION ..... *Soaking Pits*
UNITED ENGINEERING & FOUNDRY COMPANY ..... *Machinery & Mechanical Engineering*

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

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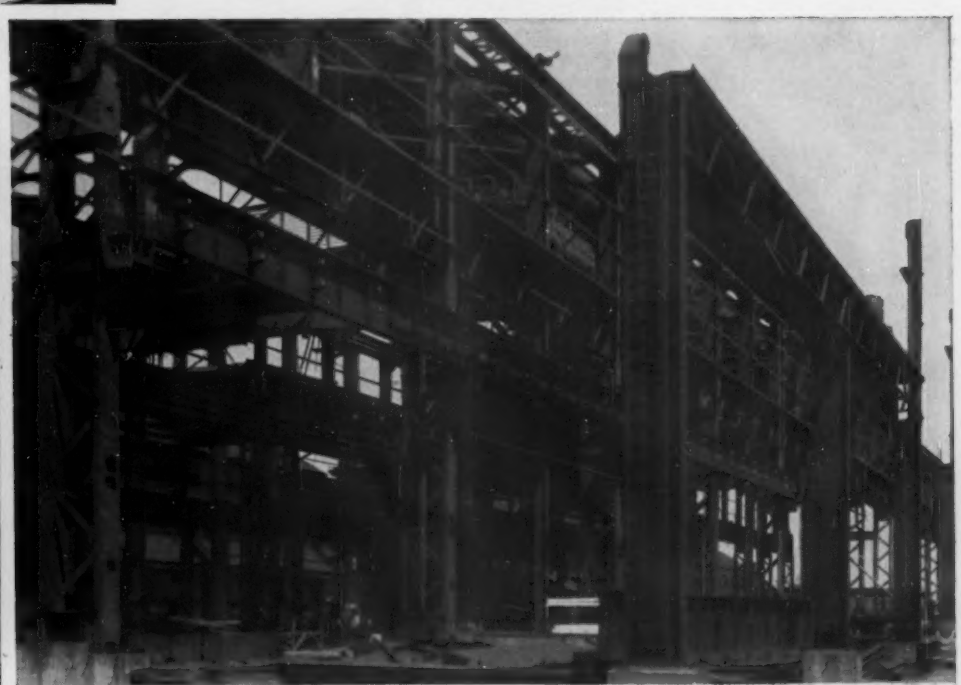
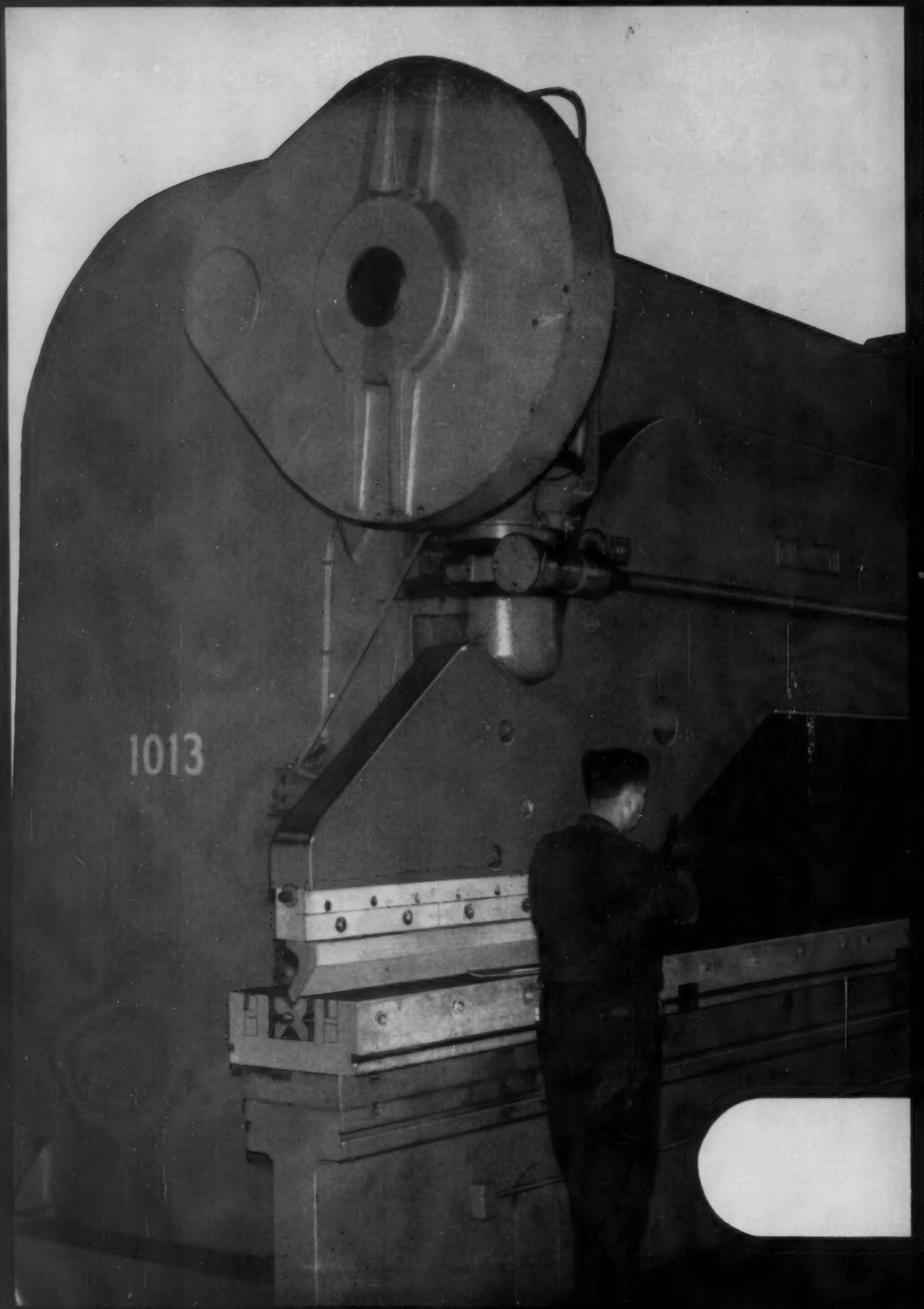
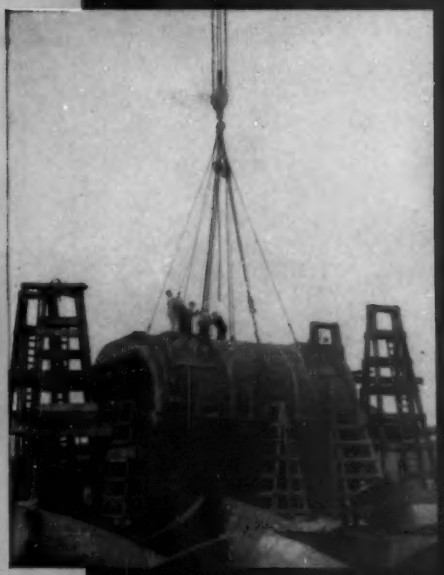
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



UNITED STATES STEEL


1013

Here- a Cincinnati Press Brake saves 3 ways...



1. TIME

2. NUMBER OF OPERATIONS

3. MATERIAL

Built at The Maryland Drydock Company, these giant condensers for the Westinghouse Electric Corporation are some of the largest ever constructed.

Photographs courtesy of The Maryland Drydock Company, Baltimore, Maryland

Crimping plate up to 3″ thicknesses has cut roll-forming time in half at The Maryland Drydock Company.

The press brake crimps the ends of the plates with special dies, and has eliminated both the costly burning operation, and the loss of 15″ to 18″ of the ends of the plates.

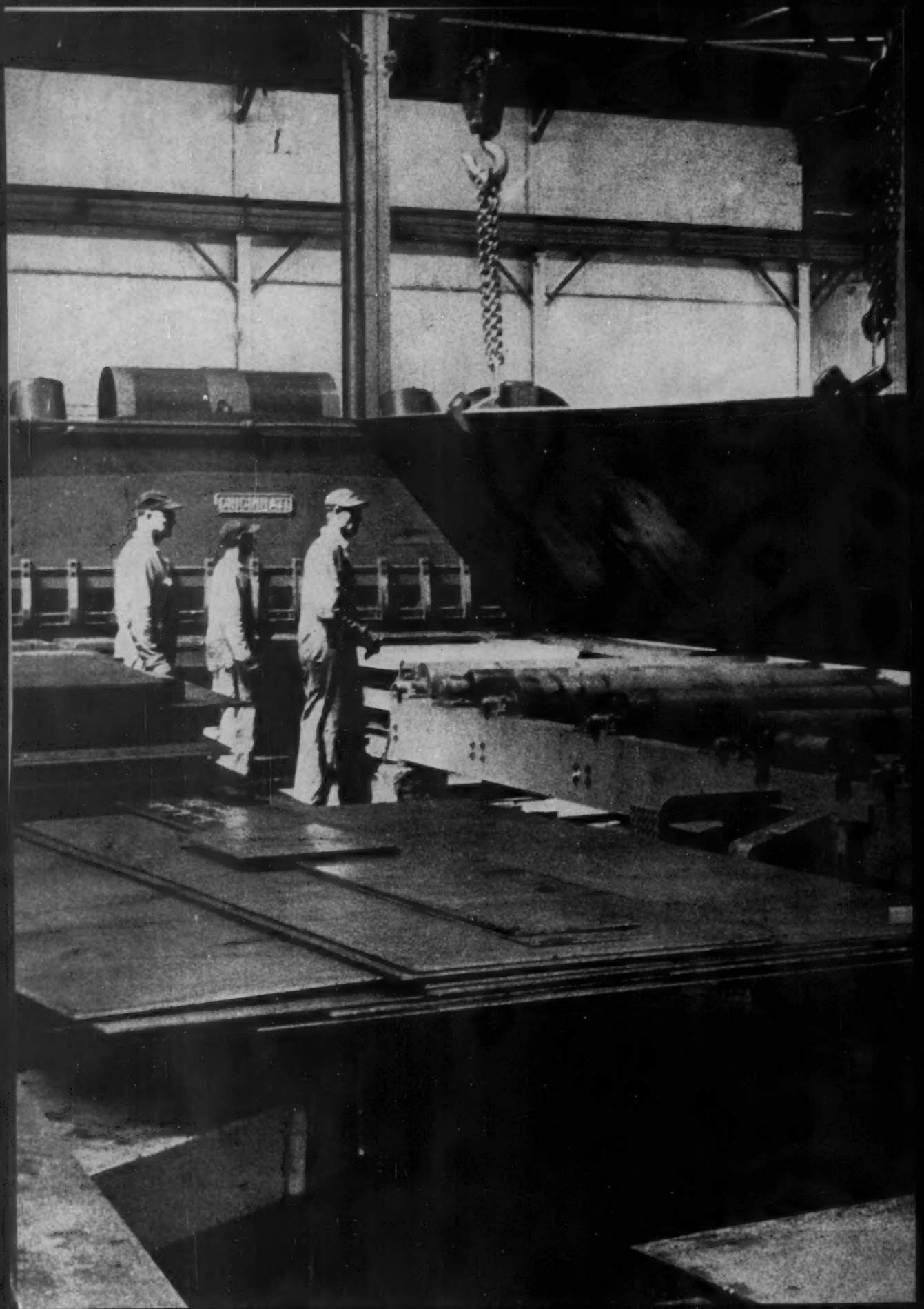
Some of the large radius bends are done entirely on the Cincinnati Press Brake.

Write for the comprehensive 72-page Press Brake Catalog B-4.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI



The Department Store of Steel

CHICAGO • CINCINNATI • CLEVELAND • DETROIT • HAMMOND • INDIANAPOLIS • LANCASTER
LOUISVILLE • MEMPHIS • NASHVILLE • NEW ORLEANS • NEW YORK • PITTSBURGH

Accurate plate and sheet shearing are two of the most important functions of a modern steel warehouse.

J & L Warehouses are fully equipped to perform these services to your specifications.

Let our many other facilities such as flame cutting and hacksaw cutting work for you to save you time, labor and money.

JONES & LAUGHLIN STEEL WAREHOUSE DIVISION
JL
The Department Store of Steel

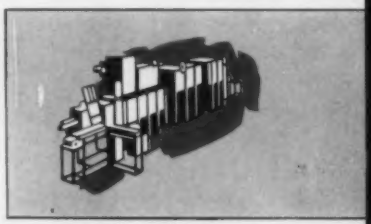
JONES & LAUGHLIN STEEL WAREHOUSE DIVISION

JONES & LAUGHLIN STEEL CORPORATION

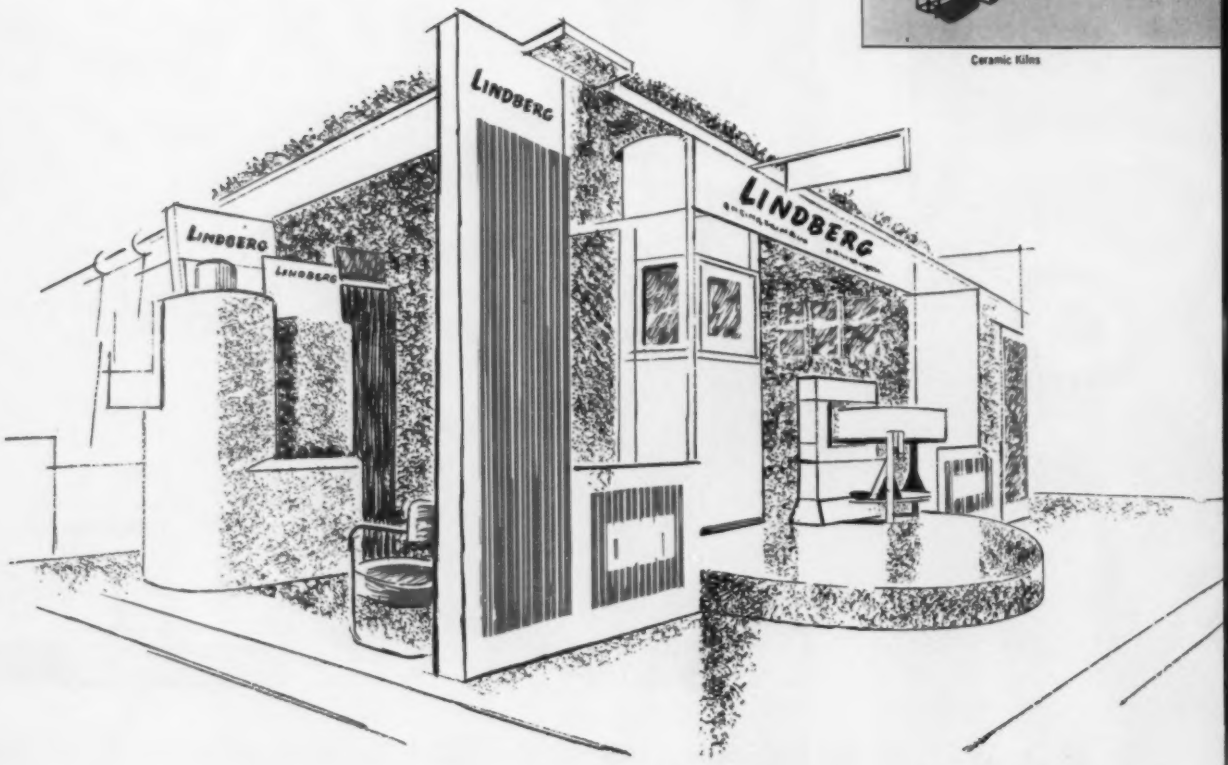
DIVISION OFFICES INDIANAPOLIS 7, INDIANA

If it has anything to do with the application of heat to Industry...

When you're at the Metal Show in Cleveland, please make it a point to visit headquarters for "Heat For Industry," the Lindberg exhibit in Booth 431. All our top people will be there, engineers, metallurgists, experts in every phase of industrial heat applications. It's quite possible that they can come up with the answer to some of your problems in this field. The latest Lindberg equipment will be shown and, particularly, we'll unveil for the first time a brand-new development in furnaces that we're confident will fill an important place in the heat treating field. Whatever your job may be, if it has anything to do with the application of heat to industry, it's worthwhile talking to Lindberg. So see us at the Show!



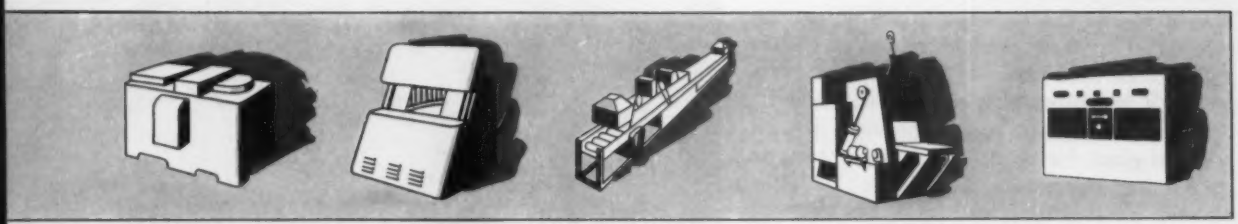
Ceramic Kilns



. . . . . BETTER TALK IT OVER WITH

LINDBERG

The safest way to be sure that you have the right answer for any application of heat to industry is to talk it over with the most widely experienced experts you can find. We believe we have them here at Lindberg. Our business is concerned only with the development of industrial heating equipment and we manufacture the most complete line in the field; heat treating furnaces, melting furnaces, high-frequency induction units, ceramic kilns; big ones, small ones, electric or fuel-fired, built in our plant or field-erected. Before you decide on any application of heat to industry, it's reassuring to know you have the right answer. Talk it over with Lindberg.



Melting Furnaces | Laboratory Furnaces | Field-Erected Furnaces | Carbonitriding Furnaces | Induction Heating Units

Here are some specific advantages you get only when you come to Lindberg:

- An organization of experts concentrating only on the development of industrial heating equipment.
- The most *complete* line of equipment insuring the recommendation of exactly the right methods for your specific product requirements and production processes.
- Research and development laboratories which have originated and perfected many important heating methods and processes. Among these are the Cyclone tempering furnace, automatic control of carbon potential in furnace atmosphere . . . 60 cycle induction melting . . . completely automatic ceramic kilns . . . the "Iron Lung" for treating stainless steel . . . vertical replaceable radiant tubes . . . CORRTHERM electric heating elements and many other innovations in the industrial heating field.
- A design committee of the country's top furnace and process engineers which, in cooperation with many of our good customers, has been responsible for such important developments as the high frequency method of heat treating automotive valves, rotary furnaces for forging and annealing titanium, reverbatory furnaces for aluminum and the automatic carbonitriding furnace universally recognized as the leader in the field.
- A world-wide organization of subsidiary companies, making available to Lindberg the latest developments in heat applications in foreign industry.
- A group of technically-trained Field Representatives located in fifteen industrial centers in the United States. There's a trained Lindberg man just as close as your telephone.

You can't afford not to get the best advice possible on your industrial heating problems. We are confident our experience can be helpful to you. Why not talk it over with Lindberg?

LINDBERG ENGINEERING COMPANY
2452 West Hubbard Street, Chicago 12, Illinois
Los Angeles Plant: 11937 S. Regentview Ave., at Downey, Calif.

Associate Companies: Lindberg Industrial Corporation, Chicago • EFCO-Lindberg, Ltd., Montreal, Canada • Lindberg Italiana, Milan, Italy • The Electric Furnace Company, Ltd., Weybridge, Surrey, England • Etablissements Jean Aubé, Paris, France • Lindberg Industrie Ofenbau, Gross Auheim, Germany • Toyo Menka, Tokyo • Lindberg Engineering Company (Australia) Pty. Ltd., Melbourne

NOW—PRECISION-MADE

Unique Optical Comparator Assures Accurate

As the first to apply the technique of micrometric projection to the manufacture of wire screen cloth, Hewitt-Robins can now meet the most exacting specifications every time. With the use of this Optical Comparator, an unusually high degree of accuracy can be obtained because all measurements and comparisons are made on a greatly enlarged image rather than on the object itself. There is no direct contact with any part nor can there be any deformity caused from measuring pressure.

The actual wire sample is projected on a master chart with such magnification that the operator can instantly see and correct the smallest variation in the specified crimp. As a result, the crimping machine can be adjusted to three decimal places to obtain maximum uniformity of product.

This is one more special Hewitt-Robins technique for assuring you the finest in wire screen cloth for every sizing, separating or screening operation. Hewitt-Robins wire screen cloth is tougher . . . resists extreme abrasion . . . lasts longer. Every piece is tightly woven with precisely accurate openings and will provide you with higher operating efficiency and lowest cost per ton.

Hewitt-Robins screen cloth is obtainable in a wide variety of weaves in plain steel, spring steel, oil-tempered steel, stainless steel and many other alloys . . . is carried in stock in both Super and Gyraloy grades, 3/16" openings and coarser.

INDUSTRIAL DIVISIONS
PRODUCTS

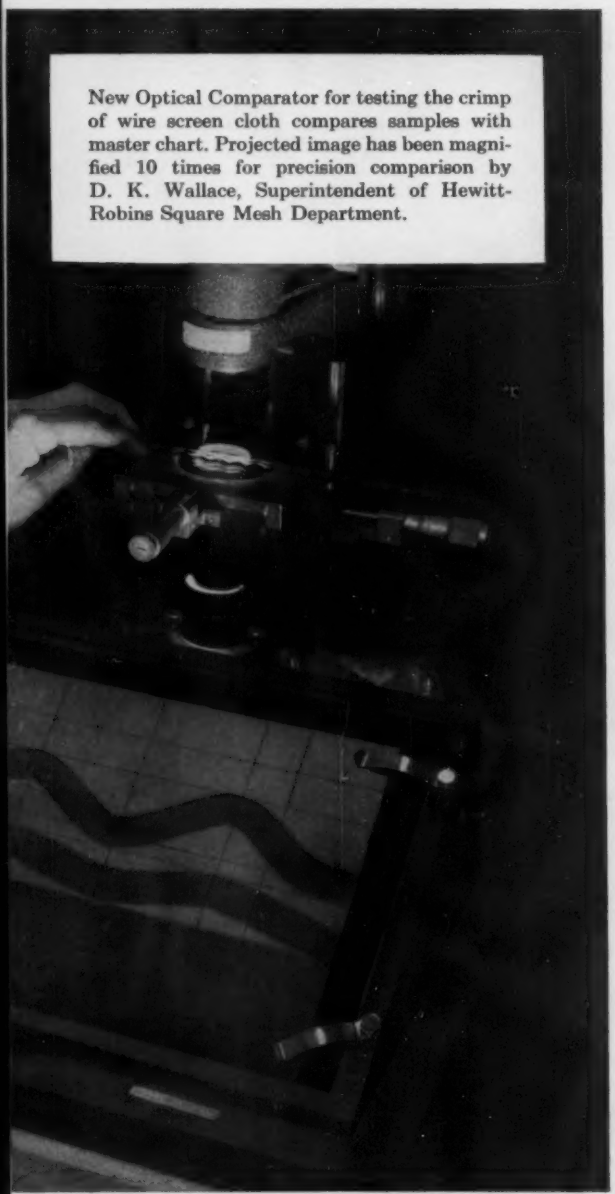
INDUSTRIAL HOSE • VIBRATING CONVEYORS
CONVEYOR BELTING • CONVEYOR MACHINERY
VIBRATING SCREENS • DESIGN, MANUFACTURE,
ENGINEERING AND ERECTION OF
COMPLETE BULK MATERIALS HANDLING SYSTEMS
"JONES" POWER TRANSMISSION EQUIPMENT
"GLIDE RIDE" THE NEW MOVING SIDEWALK

HR **HEWITT-**

STAMFORD,

SCREEN CLOTH

Quality Control



New Optical Comparator for testing the crimp of wire screen cloth compares samples with master chart. Projected image has been magnified 10 times for precision comparison by D. K. Wallace, Superintendent of Hewitt-Robins Square Mesh Department.

ROBINS

CONNECTICUT

HEWITT-ROBINS VIBRATING SCREENS

Hewitt-Robins Vibrating Screens are manufactured in a variety of styles and a wide range of sizes for every need of industry.

GYREX SCREENS

General-purpose, positive-stroke, 4-bearing screen with amazing versatility of application and an unsurpassed record for stamina in service.

STYLES M AND MS VIBREX SCREENS

Full-floating, unbalanced, pulley-type, 2-bearing screen. Offers sharp sizing of a wide variety of materials at low cost.

STYLE J VIBREX SCREENS

General-purpose screen applicable to a wide variety of screening operations. Wide range of sizes for suspended mounting.

STYLE HS HIGH-SPEED VIBREX

For fine screening operations (up to 100-mesh in some cases). Highly effective circle-throw screening action.

ELIPTEX SCREENS

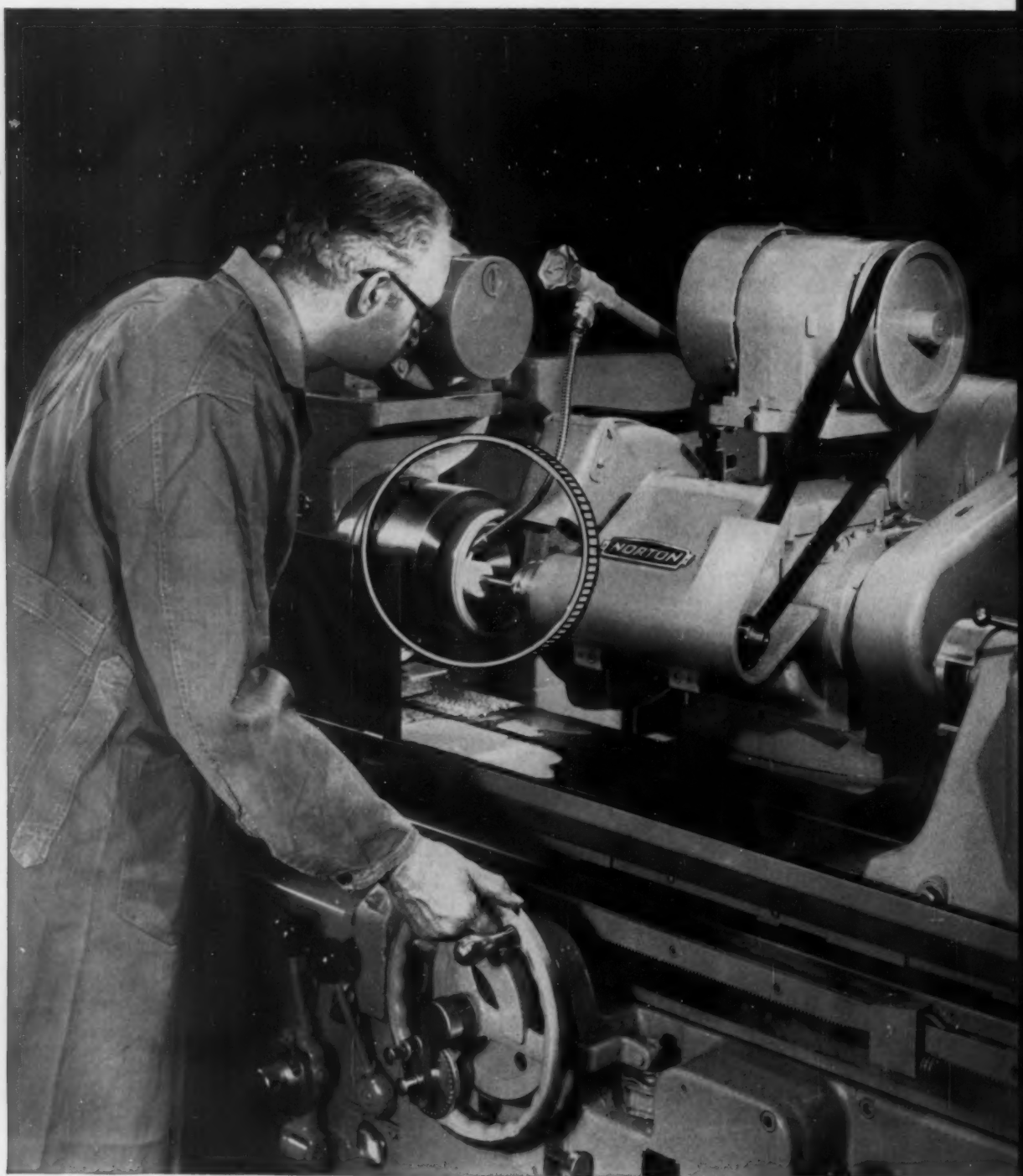
Exclusive 3-way elliptical motion for sharpest sizing and most effective dewatering. Horizontal-operating flat screens.

HI-G SCREENS

Revolutionary new "modified resonance" principle permits larger screens and bigger capacities at less power. Unusually sharp screening action. Can be made in sizes larger than any other vibrating screen on the market.

FOR SERVICE AND INFORMATION
ON BELTING AND HOSE
CALL YOUR LOCAL HEWITT-ROBINS
INDUSTRIAL SUPPLY DISTRIBUTOR
LISTED IN THE "YELLOW PAGES"

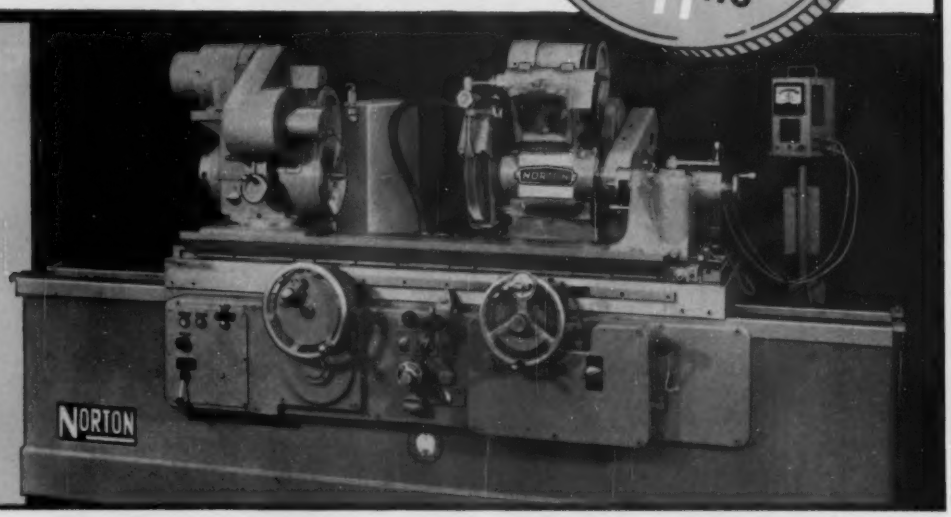
Two new Norton Universal Grinders...



QUICK "GET-AWAY", one of the biggest advantages of the new Norton 14" and 18" Type U-4 universal grinders, shifts the time-and-money-saving "Touch of Gold" from one type of grinding to another — fast.

14" and 18"...feature extra versatility... extra fast set-ups...

to bring you extra profits



NEW SIZES — NEW ADVANCED FEATURES
The popular Norton Type U-4 universal grinders are now built in 14" and 18" capacities. Note optional SWIVALIGN Unit on right of machine.

Designed for external, internal, face and angular wheel slide grinding, Norton Type U-4 universal grinding machines — in the new 14" and 18" work capacities — bring you all the famous Type U-4 features. For example:

Extremely rapid chucking, through advanced design of the headstock spindle . . . quick change-over to live or dead spindle operation . . . easy work speed change in a range of 60 to 360 r.p.m. . . . independent settings of wheel and feed for doing difficult jobs fast . . . extra capacity in wheel head and headstock . . . precise swivel table alignment with the SWIVALIGN* Dual Electric Indicator, an optional extra.

***PLUS** these new advancements:*

- Wide work speed range from AC power source with full horsepower over the entire speed range.
- Steel-tape-type base way guards protect the ways and require no additional floor space.
- Wheel spindle runs in hard bronze bearings which enclose spindle and support over 50% of spindle body.
- Footstock spindle remains in retracted position for loading.

Other Norton Universal Grinders

include the 10" and the Type U-4 12". You can depend on this complete Norton line of Norton universal grinding machines for speed, versatility and accuracy over the widest range of different grinding jobs. For complete facts on the new 14" and 18" Type U-4 grinders — or any other Norton machines — see your Norton representative or write us direct. And remember: only Norton offers you such long experience on both grinding machines and grinding wheels to help you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Massachusetts.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

To Economize, Modernize with **NEW**

NORTON

GRINDERS and LAPPERS

Making better products...to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels
Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives
Sharpening Stones • Behr-cal Tapes

District Offices:
Worcester • Hartford • Cleveland • Chicago • Detroit
In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5

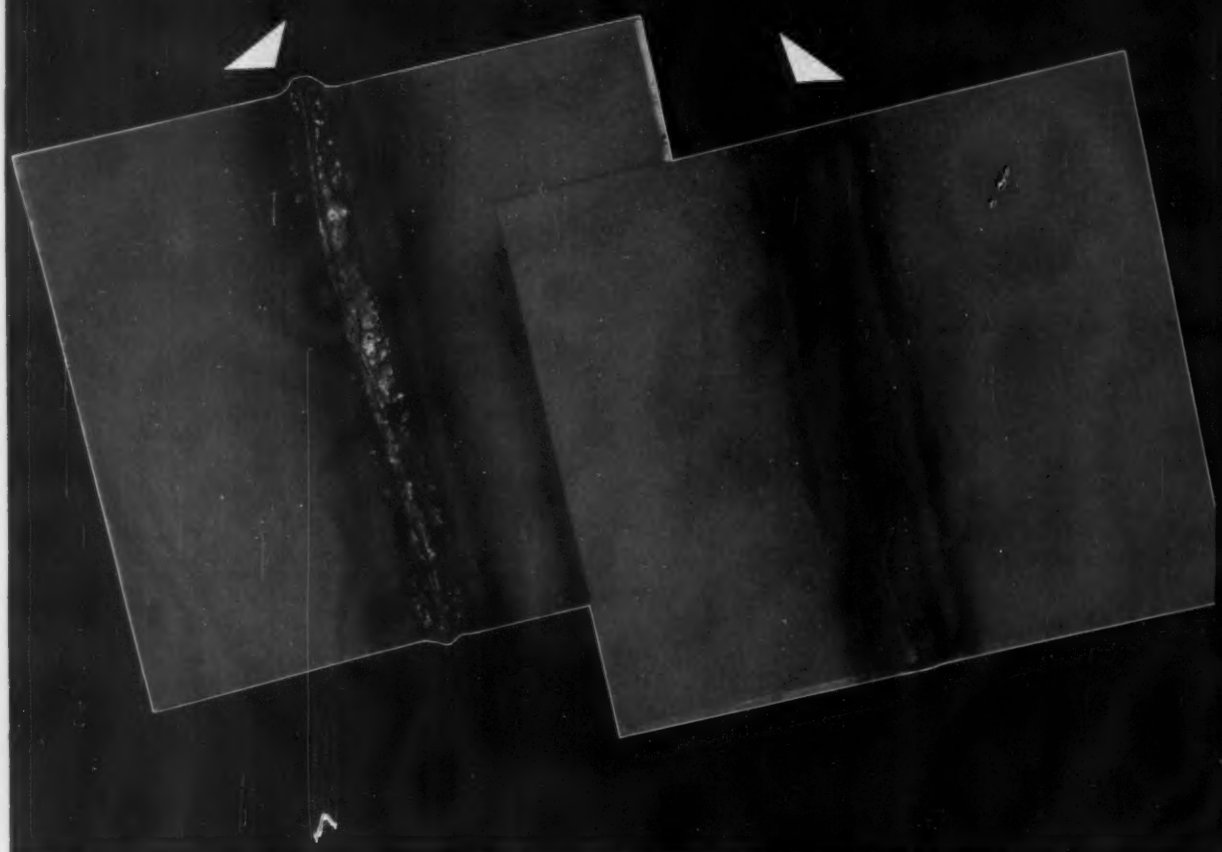
THOMSON *announces* SYNCHRO-

CONVENTIONAL FLASH WELDING

requires a separate flash trimming operation

THOMSON "SYNCHRO-SHEAR"

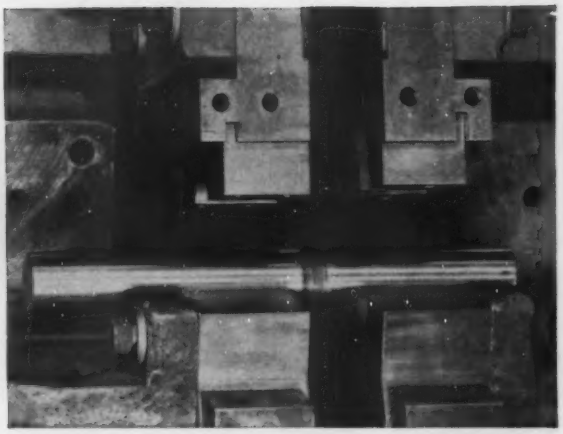
no trimming required



A conventional flash weld, as shown at the left above, requires a separate operation to remove the flash extrusion. The cost of removing the flash in a flash trimmer, or by grinding, chiseling or flame cutting, usually exceeds the cost of making the weld.

A "Synchro-Shear" flash weld, as shown at the right, requires no trimming. Because the flash is trimmed as the weld is made, no further clean-up is necessary. Even when appearance is critical, finishing time is greatly reduced.

—SHEAR



Synchro-Matic Flash Welding with Automatic Flash Shear-Off

A MAJOR DEVELOPMENT IN FLASH WELDING STEEL
...ELIMINATES FLASH CLEAN-UP, SAVES HOURS OF FINISHING

Here, at last, is a flash welder for steel products that trims the flash while it makes the weld. It eliminates the need for separate flash trimmers — saves hours of cleaning up the flash extrusion or grinding away the upset.

Synchro-Shear, an exclusive THOMSON development*, adds automatic flash shearing to the proven performance of *Synchro-Matic* Flash Welders. Now you can flash weld carbon steel from mild to 1.00 carbon, high speed steel, high alloy steel and stainless steel, with speed, consistency and excellent weld quality while eliminating slow and costly post-weld clean-up. Synchro-Shear will weld and remove the flash from these materials in rectangular, round or irregular shapes.

Synchro - Shear Flash Welders are available in a complete family of RWMA sizes, tooled to suit your product. Write for complete information.

*"Pinch-Off Dies," now in wide use for removing the flash while welding aluminum, copper and other soft materials, are another Thomson development.

SEE SYNCHRO-SHEAR IN ACTION...
Booth 1751 — METALS SHOW, Cleveland, October 8 - 12

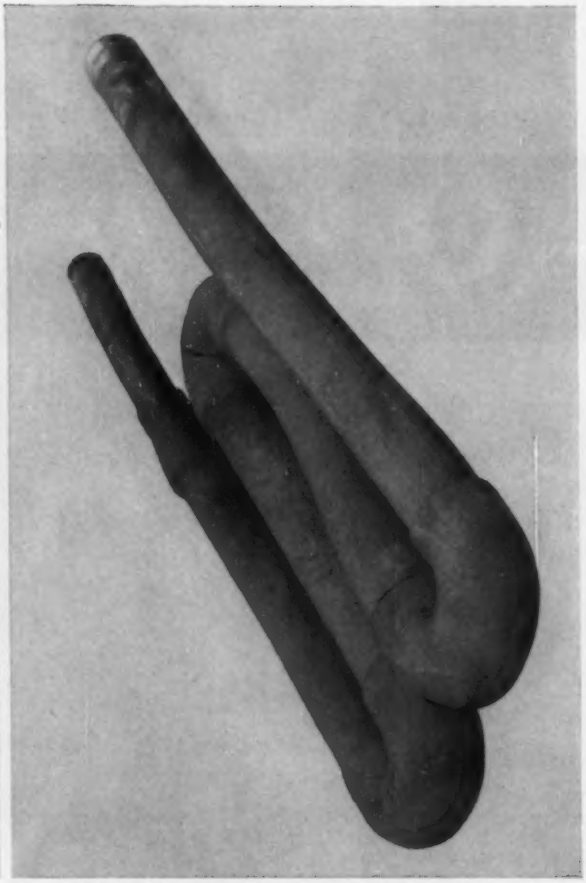
FOUNDED IN 1886 BY ELIHU THOMSON
INVENTOR OF RESISTANCE WELDING

THOMSON *Welders*

THOMSON ELECTRIC WELDER COMPANY
360 PLEASANT STREET • LYNN, MASSACHUSETTS

Thomson makes a complete line of standard spot, projection, seam and flash-butt welders. Also, aircraft, brake shoe, fabric and other special purpose resistance welders.

This unretouched photograph shows deterioration of 25-12 alloy radiant tube after 10 months service.



This unretouched photograph shows radiant tube of NA22H still in serviceable condition after 78 months service in the hot zone where temperatures averaged 1850°F.

NA22H establishes new service record!

Has provided five times longer service life for radiant tubes in annealing furnace...and still going strong

Faced with mounting production losses and increasing tube replacement costs, a manufacturer of continuous weld carbon pipe began to experiment with the new high temperature alloy NA22H for the "W" type radiant tubes in his annealing furnaces.

After seven years of in-use testing in all heat zones of the furnaces, this user found that the service life of radiant tubes made of NA22H was increased far beyond the performance range of radiant tubes made of 25-12 type alloy.

After a total of 78 months service in temperatures ranging from 1700 to 1925°F., the NA22H tubes were found to be in good condition and still continue in service. A 25-12 tube installed in the same position failed after 10 months service.

Since its introduction eight years ago, NA22H has proven itself in many applications where severe operating conditions and elevated temperature ranges are the rule.

A National Alloy engineer will be glad to show you further proof of performance, and to discuss the use of NA22H in your operation.

50th Anniversary BLAW-KNOX 1906-1956

BLAW-KNOX COMPANY

National Alloy Division

Pittsburgh 38, Pennsylvania

THE MARK OF QUALITY NA NATIONAL ALLOY

How BRAINARD STRAPPING SERVICE saved 89% on shipping cost

PACKAGE COST for shipping these concrete "edgers" was cut 89% at the Heltzel Steel Form & Iron Company by converting from expensive wood crates to corrugated cartons strapped with ½" Brainard .015 strap. Other savings:

LOWER FREIGHT COSTS

Strapped carton weighs 19 pounds less.

FASTER OPERATION

One man does job of two required in former operation.

EASY STORAGE

Two cartons displace one wood crate, which frequently warped with changing weather conditions.

This cost-cutting operation was recommended by a Brainard strapping expert. No matter what you make, package or ship, a nearby Brainard representative can show you the way to similar savings. Call him today, or write:

Brainard®
SHARONSTEEL
STEEL DIVISION
SHARON STEEL CORPORATION

THE BRAINARD STEEL DIVISION
of the Sharon Steel Corporation
Dept. I-99, Griswold St.
Warren, Ohio

MAKERS OF QUALITY STEEL STRAPPING

You Benefit from ELECTROMET'S

through Research * Development

Production * Service

For 50 years ELECTROMET has produced ferro-alloys and metals essential in the production of steel, iron, and non-ferrous metals. Research and development by ELECTROMET during these 50 years have provided the trade with new and better alloys and metals to meet specific needs. Increased emphasis on research and development promises continued benefits in the future.

The ELECTROMET story is one of steady growth and progress for the benefit of the metal industries. When you buy from ELECTROMET, you get the best in alloys and service plus the advantages of long manufacturing experience and extensive research.

Here are some of the advantages you get from ELECTROMET's *integrated programs.*

Competent Metallurgists and Sales Engineers

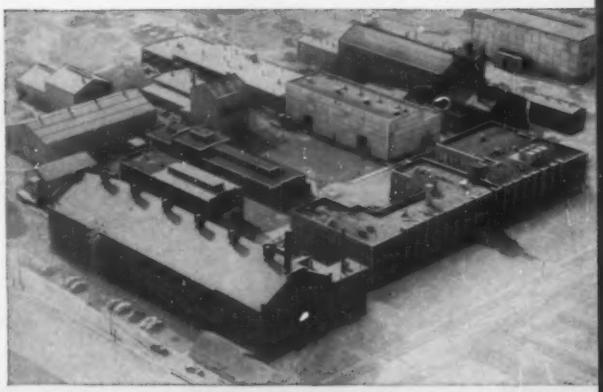
Nine sales and service offices are strategically located in the major steel producing centers as shown on the map above. If you have a problem on metals or alloys, let one of our experienced metallurgists or sales engineers help you. He will be glad to assist you with any problems on the production of quality steels, irons, and non-ferrous metals. Simply telephone or write the ELECTROMET office nearest you.

B Ca Cb Cr Mn Si Ti V W Zr

50 Years of Experience

Continuing Research and Development

Since 1906 ELECTROMET has carried on a three-way program of research, development, and technical service. More than 300 skilled research scientists, engineers, and technicians work in ELECTROMET's Metals Research Laboratories and Development Laboratories at Niagara Falls (shown here). This program provides you with new ferro-alloys and metals, better ways of using them, and new and improved alloy steels and irons. Innovations are fully developed in our laboratories before they are offered commercially.



Wide Range of Alloys to Meet Your Needs

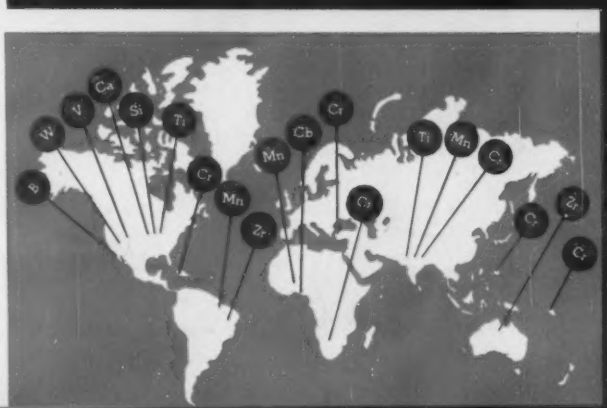
Over 50 different products are manufactured to meet the regular requirements of the metal industry as well as the special needs of customers. This wide range of high-quality ferro-alloys and metals is the result of 50 years of research, development, and service by ELECTROMET. ELECTROMET offers the widest selection of ferro-alloys and metals to meet your specific requirements.

Seven Modern Plants—4 With Own Power Facilities

Our plants have been greatly expanded and modernized to meet the current demands for ferro-alloys and metals. The recently completed plant at Marietta, Ohio, is the world's largest ferro-alloy plant. Company-owned power facilities at four of the plants assure a constant supply of power for efficient production. Prompt shipment of ELECTROMET ferro-alloys is assured from all seven plants, and from six warehouses conveniently located to serve you.

World Wide Ore Sources

The availability of ores, and other raw materials is assured by ELECTROMET's diverse facilities, including mines and ore milling plants owned by UNION CARBIDE. Helping to assure adequate ore supplies are the ore buying facilities of Union Carbide Ore Company, a Division of Union Carbide and Carbon Corporation. Ores come from the far corners of the earth to ELECTROMET's plants. On this simplified map of the world, symbols for the chemical elements indicate a few of the major sources of alloy ores.



ELECTRO METALLURGICAL COMPANY

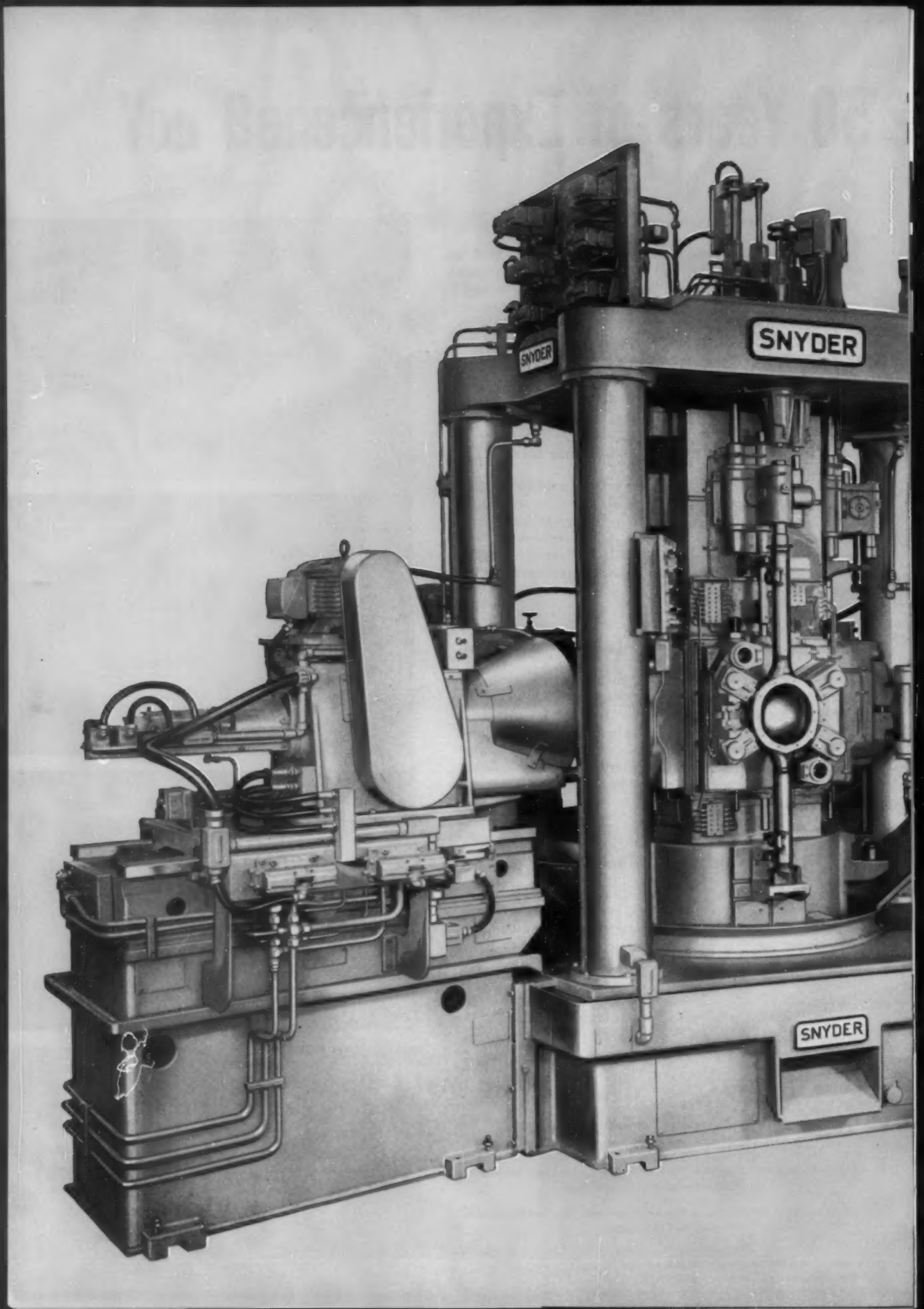
A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

OFFICES: Birmingham • Chicago • Cleveland • Detroit • Houston • Los Angeles
New York • Pittsburgh • San Francisco

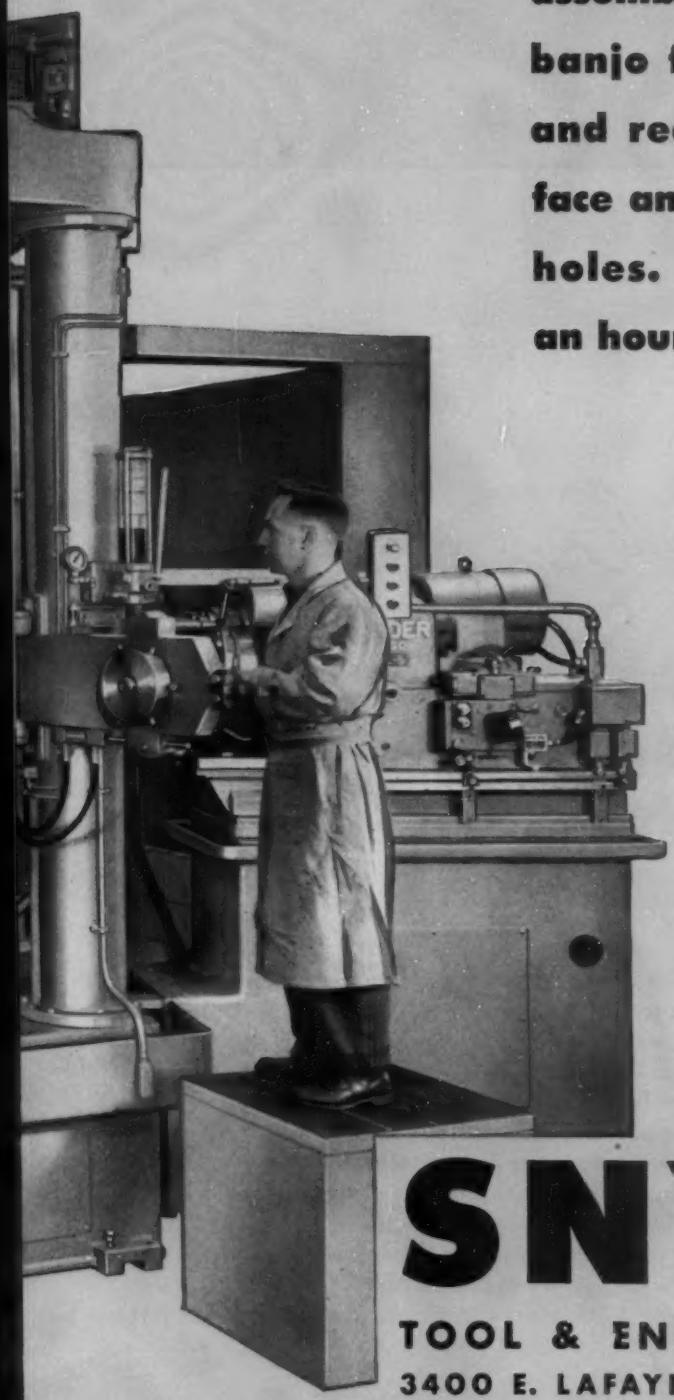
In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario

The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.


SNYDER
SNYDER
SNYDER

SNYDER VERTICAL TRUNNION MACHINE

for processing rear axle housing assembly; rough and finish faces banjo face, combination drills and reams ten holes in banjo face and chamfers both sides of holes. Production: 105 pieces an hour at 100% efficiency.



SNYDER

TOOL & ENGINEERING COMPANY

3400 E. LAFAYETTE • DETROIT 7, MICHIGAN

31 Years of Special Machine Tools with Automation

Another Natco®

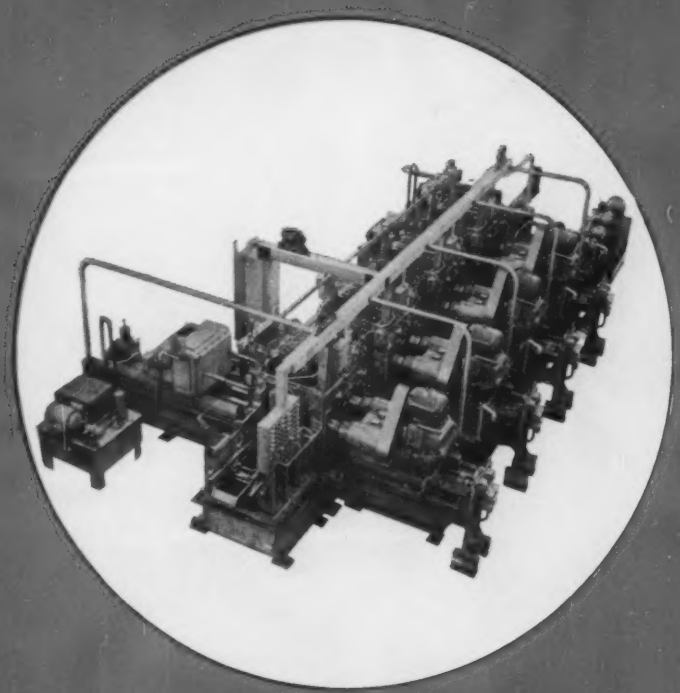
Delivery schedules of capital goods such as large, high-production machines present problems for machine tool builders. At Natco these problems are as serious as with any builder. But Natco's current record for on-time shipment is remarkably good . . . 86% either on schedule or better than schedule.

And we're not stopping there . . . we are adding 50% more production capacity to further improve our delivery schedules.

Production schedules of consumer products also present serious problems. With modern, high-production, cost-saving machine tools, many perplexing production schedules become routine.

Call in a Natco Field Engineer to discuss your next production problem. You can count on his recommendations *and* his delivery promises.

Shipped on Time



Multiple spindle drilling, boring, facing and tapping machines.
Special way-type, index and transfer machines.

Call Natco offices in Chicago, Detroit, Buffalo, New York, Boston, Philadelphia, Cleveland and Los Angeles; distributors in other cities.

Natco Holeway® transfer machine turns and faces 120 cylinder blocks per hour.

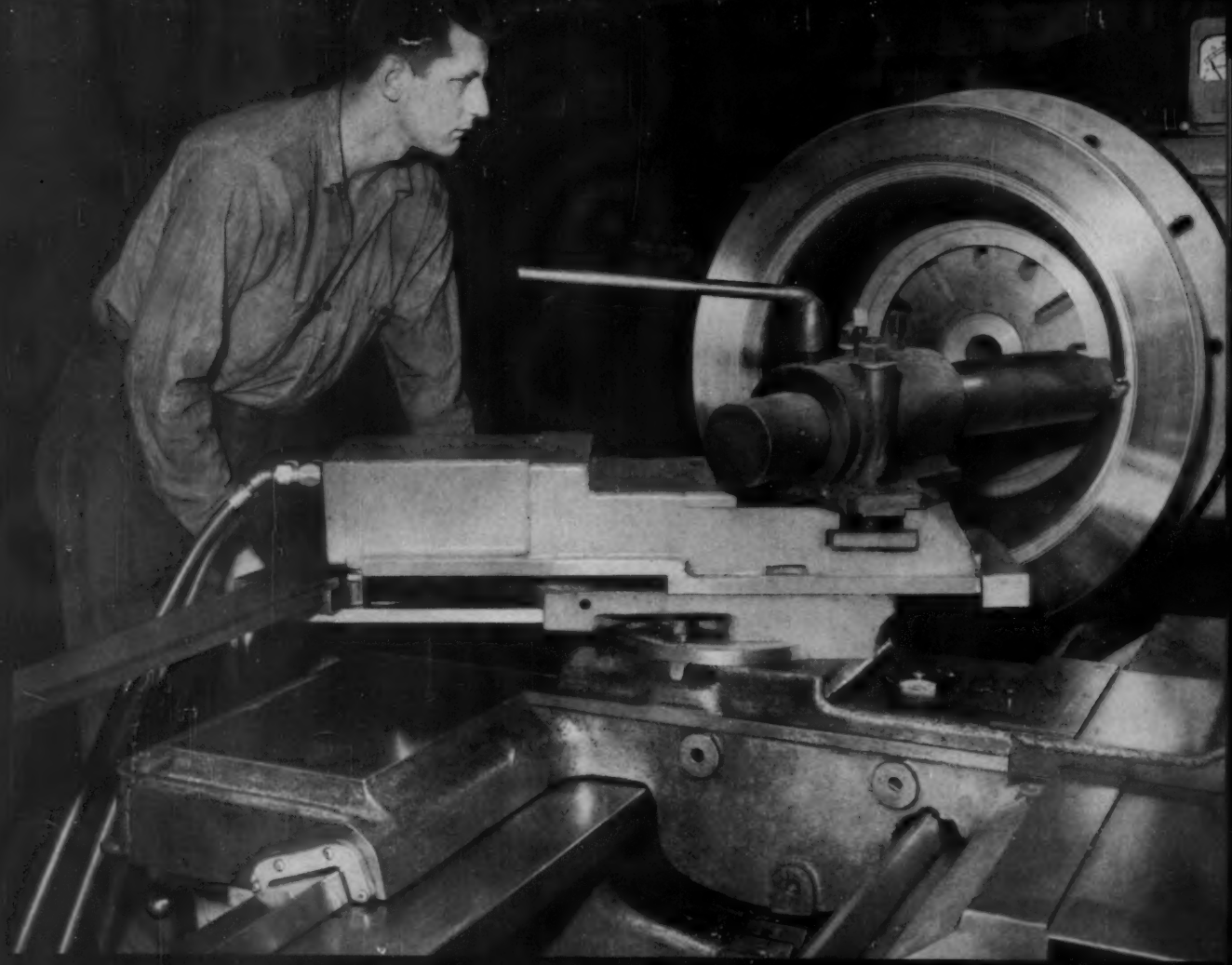
NATIONAL AUTOMATIC TOOL COMPANY, INC. ***Richmond, Indiana***

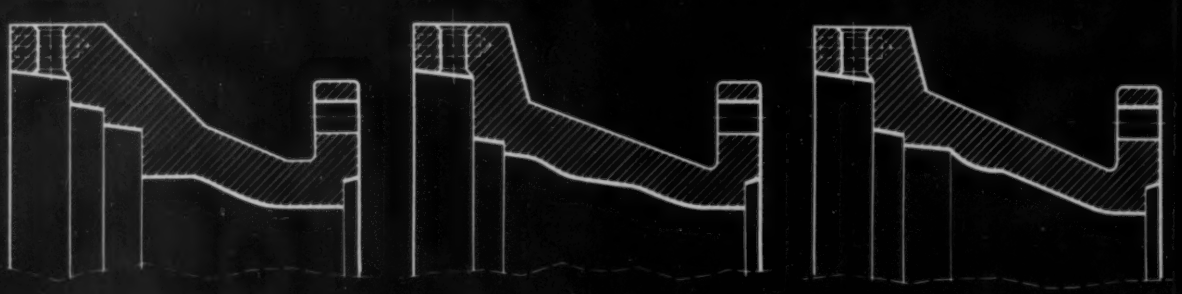
NATCO

Ask for information about the PAYD (Pay-As-You-Depreciate) Finance Plan.

before you buy a tracing lathe,

find out how economically





you can . . .

add HYDRA-TRACE* to your Present LeBlond

American Cast Iron Pipe Co. did! Now they have all the advantages of a "new" tracing lathe, at a fraction of new-lathe cost. Actually, Hydra-Trace Duplicating Attachment is quickly and easily installed on most any LeBlond Lathe built since 1935.

This tracing-boring job at American Cast Iron Pipe Co., Birmingham, Ala., is a good example of Hydra-Trace performance. Bells for centrifugal pipe molds are machined internally with Hydra-Trace feeding at 30° angle. The part is finished in one-third time required for hand-fed turning. Details of the machining operation were worked out by LeBlond engineers, who prepared prints and template pattern for American.

LeBlond offers a wide variety of useful turning attachments. Because of the inherent stamina of LeBlond machines, our customers often solve special turning problems by adding to their present machine—good for many more years of dependable service.

Perhaps you, as a LeBlond Lathe owner, have a tracing job made to order for Hydra-Trace. Our field engineers are always on call, ready to work with you in solving your specific turning problems. Write today and tell us your needs.

*Hydra-Trace (Trade Mark registered U.S. Pat. Off.) is LeBlond's heavy-duty hydraulic tracing attachment. Can be mounted in place of compound rest on practically all LeBlond lathes built since 1935.

Simply adding HYDRA-TRACE made a tracing lathe of this five-year-old 32" LeBlond Heavy Duty—at small cost. These parts call for tracing-boring operation. Material #1025 steel; spindle speed 35 rpm; feed .016; carbide tool; finish 60 micro-inches; tolerance ±.0025. Machining time 3 hours, one-third time required for hand-fed turning.

. . . cut with confidence

LeBLOND of Cincinnati

THE R. K. LEBLOND MACHINE TOOL COMPANY
CINCINNATI 8, OHIO

World's largest builder of a complete line of lathes for more than 69 years

take advantage of Claymont's

If you have to turn down jobs because you don't have the right equipment . . . if you have equipment that's only being used part time . . . if you take "profit-killing" jobs to be of service to your customers . . . if you're interested in a new and easier way to handle difficult fabricating jobs . . . **it'll pay you to get the story on Claymont's Fabricating Service.**

You see, Claymont maintains a modern, fully-equipped machine and fabricating shop as part of its extensive steel mill operations. A shop that specializes in both difficult and mass-production operations.

What does this mean to you? It means that, before the steel ever leaves the mill, Claymont can perform the fabricating operations you don't want to handle. This eliminates needless scrap . . . stops freight, storage and handling costs on metal you can't use . . . enables you to make better use of your capital by reducing your needs for seldom-used patterns and equipment . . . and assures you of a constant steel supply from Claymont's widespread producing facilities.

For further details, contact your nearby CF&I representative or write today to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware.

An overall view of Claymont's new, enlarged Fabricating Shop. It occupies over 100,000 square feet of floor space.

CF&I

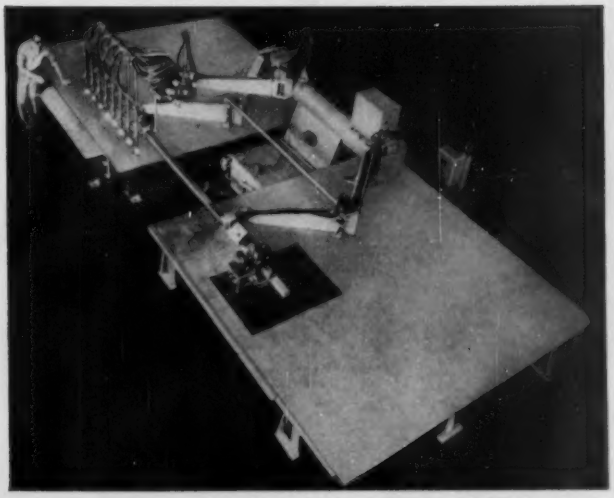
Claymont Steel Products

Products of Wickwire Spencer Steel Division · The Colorado Fuel and Iron Corporation

Albuquerque · Amarillo · Atlanta · Billings · Boise · Boston · Buffalo · Butte · Casper · Chicago · Denver · Detroit · El Paso · Ft. Worth · Houston · Lincoln Los Angeles · New Orleans · New York · Oakland · Odessa · Oklahoma City · Philadelphia · Phoenix · Portland (Ore.) · Pueblo · Salt Lake City · San Francisco Seattle · Spokane · Tulsa · Wichita · CF&I OFFICES IN CANADA: Toronto · Montreal · CANADIAN REPRESENTATIVES AT: Calgary · Edmonton · Vancouver · Winnipeg

4258

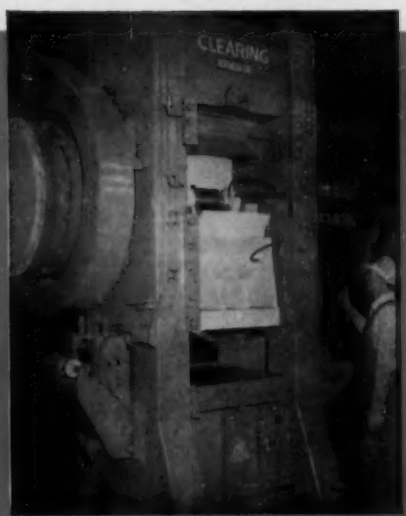
steel fabricating service



One of Claymont's multi-torch travographs which are used to produce a wide variety of flame-cut steel plate shapes.

Can you use this Claymont machinery?

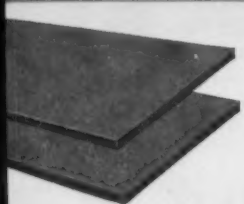
- Multi-torch Travographs
- Radiographs
- Special Edge Preparation Burning Equipment
- Heavy Duty Shears
- Bending Roll
- Press Brake
- Mechanical Presses
- Vertical Punching Equipment
- Vertical Boring Mill
- Radial Drills
- Vertical Milling Equipment
- Surface Grinding Equipment
- Do-ALL Saw
- Horizontal Turning Equipment



← Claymont's new shop is equipped with several mechanical presses, including this one having an 800-ton capacity.

→ This 16-foot vertical boring mill enables Claymont to perform operations which are impractical for the average fabricating plant.

OTHER CLAYMONT PRODUCTS



Steel Plates
Alloy • High Strength Low Alloy
Stainless-Clad • Nickel Plated

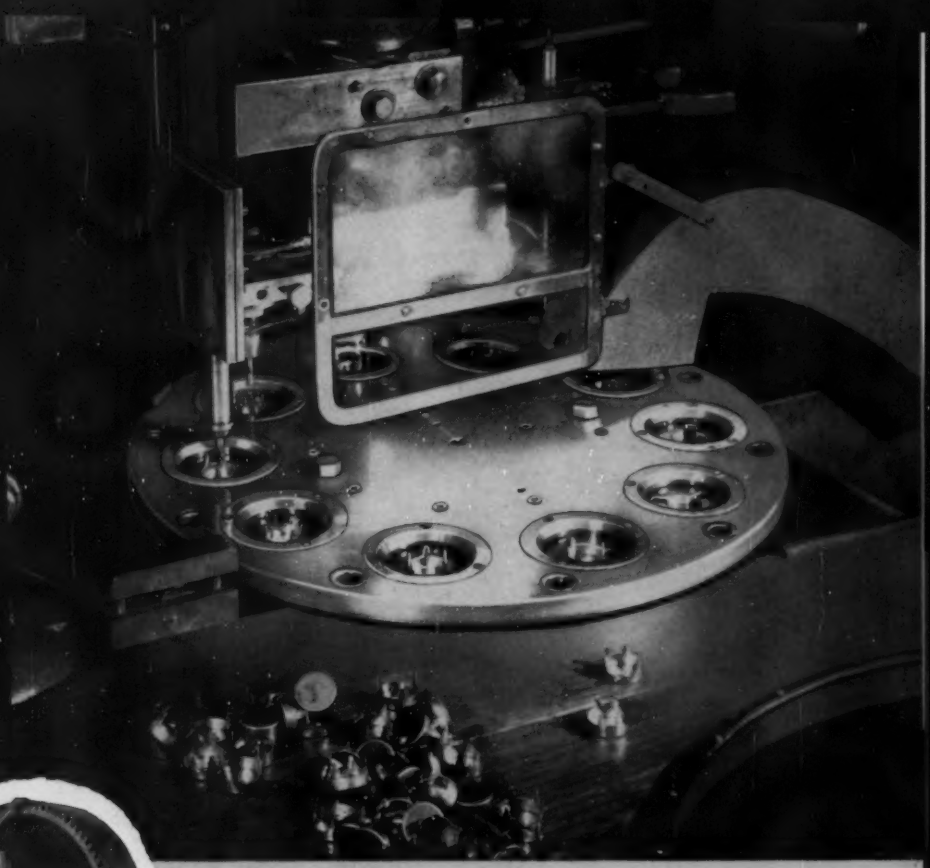
Flanged and Dished Heads

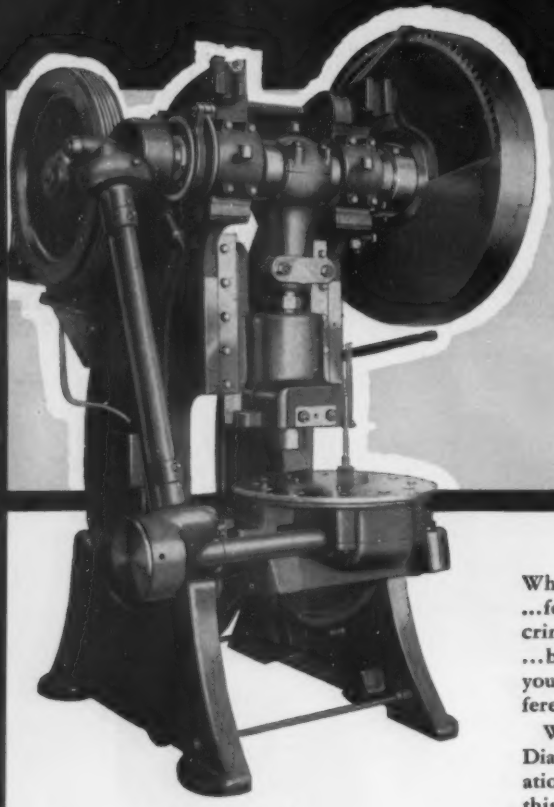
Manhole Fittings and Covers

4258

Large Diameter Welded Steel Pipe

MODERN FEDERAL DIAL FEEDS have what it takes!





No. 7 Dial Feed
Capacity, 80 tons

VERSATILITY plus AUTOMATION

What's the job? Drawing... staking ...forming... piercing... stamping... crimping... punching... broaching ...burring... assembling? Maybe in your plant it's all of them, or a different, unique operation.

We'll lay two-to-one that Federal Dial Feeds are just what your operation needs. For the possibilities of this press with special jigging are practically unlimited. Add automatic feed and ejection and you have the answer to many cost problems.

Modernize now with Federals and eliminate the need for expensive, specialized equipment. Rugged, precision-built Federals embody the finest materials and workmanship. Available in sizes from 6 to 80 tons. *Write for new Dial Feed Catalog.*

THE FEDERAL PRESS COMPANY
602 Division Street, Elkhart, Indiana

FEDERAL DIAL FEED PRESSES

31 Years' Experience in Dial Feed Engineering and Construction

Everybody's talking about...
the new
"WB" BRAKES
by EC&M
Now 100% Lubricated
for Longer Life
6 new sizes of "WB" Brakes for AC and DC motors meet these AISE-NEMA Standards
Mounting Dimensions
Wheel Diameters
Torque Ratings

these improvements
EASIER TO MAINTAIN

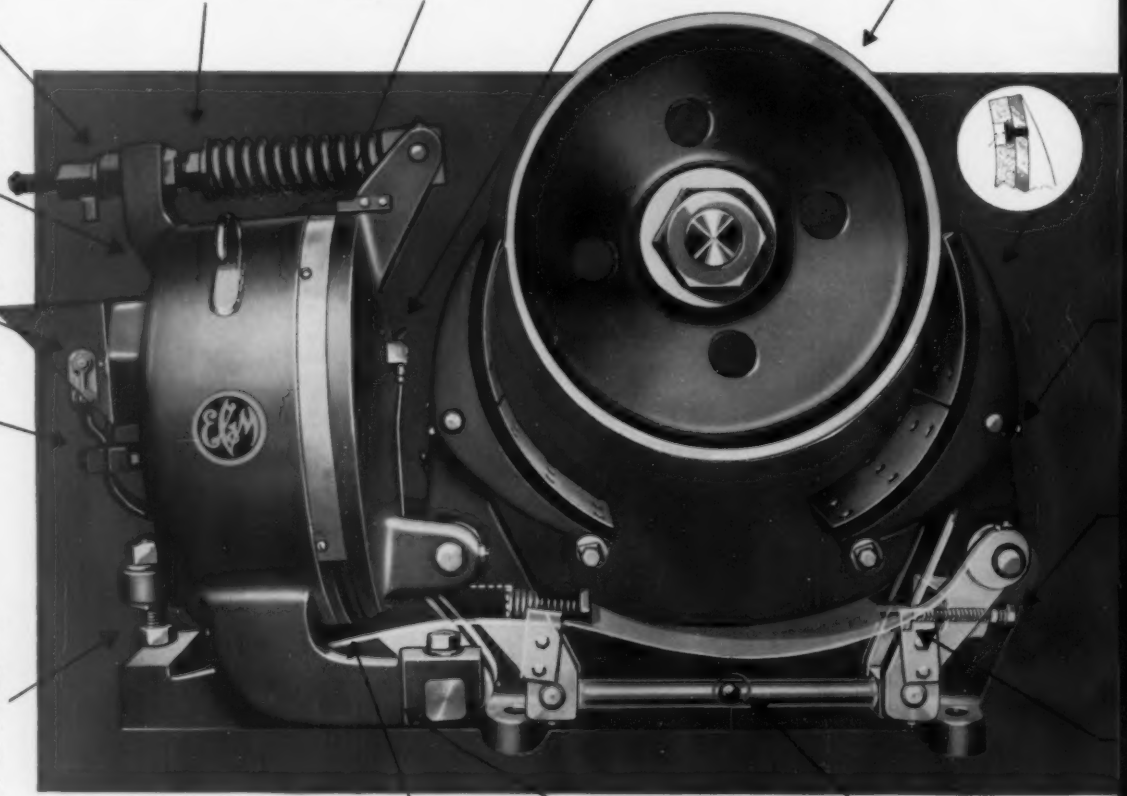
Manual release is standard on all sizes of these AISE-NEMA WB Brakes.

Bronze adjusting-nut on torque-spring rod has fine pitch threads for easier and closer adjustment.

Armature air-gap indicator shows visually when adjustment is needed to compensate for brake-lining wear.

100% - lubricated forces dirt out, all bearings alemite-lubricated.

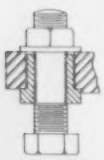
ECAMITE wheels are furnished as standard on all "WB" Brakes.



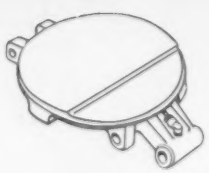
Magnet-case remains stationary and contains unit, armored coil.

Coil leads with solderless connectors under protective shield. Conduit connection box is optional.

Cable clamps for customer's incoming leads.



Single adjustment for brake lining wear. Adjusting-nut screws into stainless steel threaded bushing in magnet-case. This gives longer threaded path for greater bearing surface — easier adjustment — only single wrench required. Nut on top locks against machined surface.



Armature-face recessed at bottom allows dust to fall free — prevents clogging.

Magnet-case removable as a unit without disturbing remainder of brake.

Connecting lever remains below the brake wheel and is of tubular construction. Alemite fitting (on both sides) permits greasing four bearings from this one fitting.

ARMORED COIL CONSTRUCTION

WB Brake coils . . . protected by a steel enclosure, permit quick coil removal. After vacuum-impregnating with No. 371 polymerizing varnish and baking, coil is sealed in its protective enclosure with No. 372 Epoxy compound. This compound does not soften, but holds the coil securely against movement.

make the new "WB" brakes . . LONGER LASTING!

Molded brake blocks, riveted securely in place, are made from an improved material having a higher coefficient of friction. Permissible wear is ⅛" on the smallest size to 7/16" on the largest size.

Fixed bearing-pins locked with stainless steel setscrews reduce number of lubrication points.

This adjustment equalizes clearance of both shoes.

Hardened steel camrails retain clearance between shoes and wheel with brake released.

These new EC&M "WB" Brakes are built to AISE-NEMA standards. The basic principles which made "WB" Brakes the outstanding brake for heavy mill service have not been changed. The new design includes several improvements making EC&M "WB" Brakes even longer lasting and easier to maintain. These improvements are:

1 — 100% lubrication . . . for longer life, for freedom of operation by forcing dirt out of bearing surfaces.

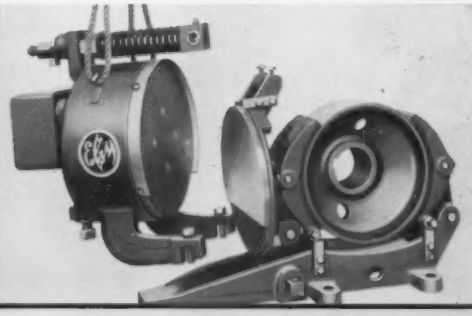
2 — Recessed armature . . . eliminating pocket for dust collection.

3 — Single wrench adjustment for brake-block wear . . . restores air-gap to normal, adjusting-nut has fine pitched threads.

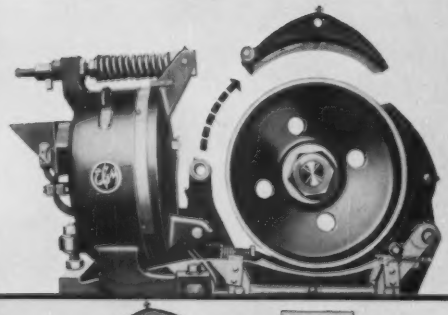
Remaining unchanged because of their proven acceptance and time-saving advantages are these features:-nothing over the brake wheel, manual release, single adjustment for lining wear, stationary magnet and sturdy 2-shoe construction.

These new EC&M "WB" Brakes are available with series and shunt coils for d-c service, and are supplied for rectifier-operation on a-c circuits. For LONG-LIFE Brakes, specify "WB" Brakes by EC&M.

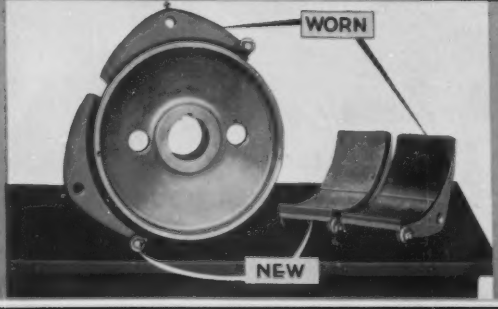
SIMPLIFIED MAGNET REMOVAL
Maintenance men appreciate the time-saving construction that makes coil changing a simple procedure. The magnet case can be swung away without disturbing the remainder of the brake. A coil can be replaced quickly or a complete new magnet installed in a matter of minutes.

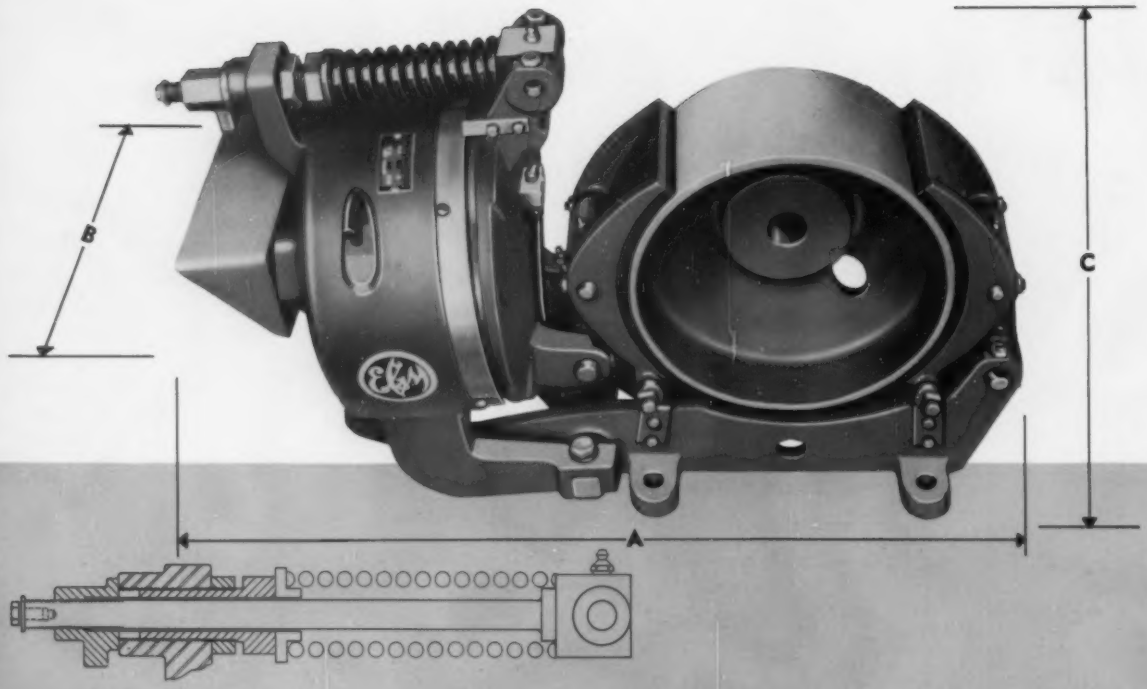


SHOES AND LINERS EASILY REMOVED
With shoe bearing-pins slipped out, shoes slide up on top of the wheel easily to permit worn brake-linings to be replaced. This has been standard construction with "WB" Brakes for years.



ACCURATELY FORMED RENEWABLE BRAKE BLOCKS
WB Brake Blocks retain their frictional quality longer than any other braking material. They are accurately formed so that new blocks fit the arc of the wheel and shoe surface as accurately as the original block.

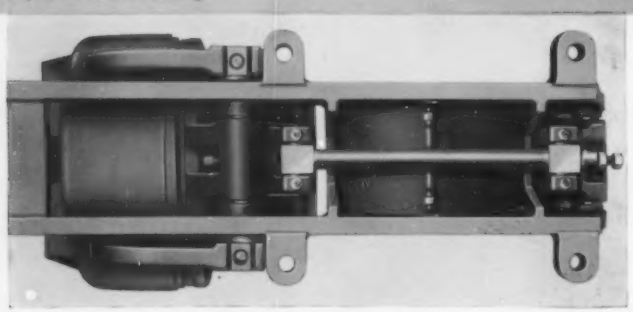




NEW OPERATING SPRING CONSTRUCTION

Operating spring force transmitted directly to magnet armature. Guide rod, threaded only at outer end under manual release (bronze) nut, is under tension only when brake is manually released. Brake torque is adjustable by a bronze nut threaded into the magnet-lug. Fine pitch threads permit closer and easier torque-adjustment. A jam-nut locks the setting.

Brake Size (Wheel Diameter)	600-Series Motor size	BRAKE TORQUE RATINGS in Lbs. Ft.				Approximate Outline Dimensions in Inches		
		Series-Wound Brakes		Shunt-Wound Brakes				
		½ hour Rating	1-hour Rating	1-hour Rating	Continuous Rating	Length "A"	Width "B"	Height "C"
8" WB	402 602	100	65	100	75	24¼	9¼	13½
10" WB	603 604	200	130	200	150	27¼	10¾	16⅜
13" WB	606 608	550	365	550	400	34¾	13¼	20⅛
16" WB	610	1000	650	1000	750	38⅝	15½	22¾
19" WB	612 614	2000	1300	2000	1500	45¾	18½	26½
23" WB	616 618	4000	2600	4000	3000	55⅜	21⅞	31⅛



Bottom view of new "WB" Brake showing tubular connecting lever for lubricating bearings at both ends from one alemite-fitting. The brake can be mounted either right or left hand, and the lubrication may be applied from either side through an opening in the brake frame.

EC&M "WB" Brakes have long been known for their fast response in releasing and setting. The fundamental short-stroke characteristic of these new "WB" Brakes which gives quick action has been proved on crane-hoists and hard-worked mill applications. Unit pressure between brake shoe and wheel remains at substantially the same low value as in the previous WB Brakes. These new EC&M "WB" Brakes, built to the AISE-NEMA Standards, are designed to give smoother operation . . . safer stops . . . and less maintenance. Specify EC&M Bulletin 1000 Type WB Brakes.

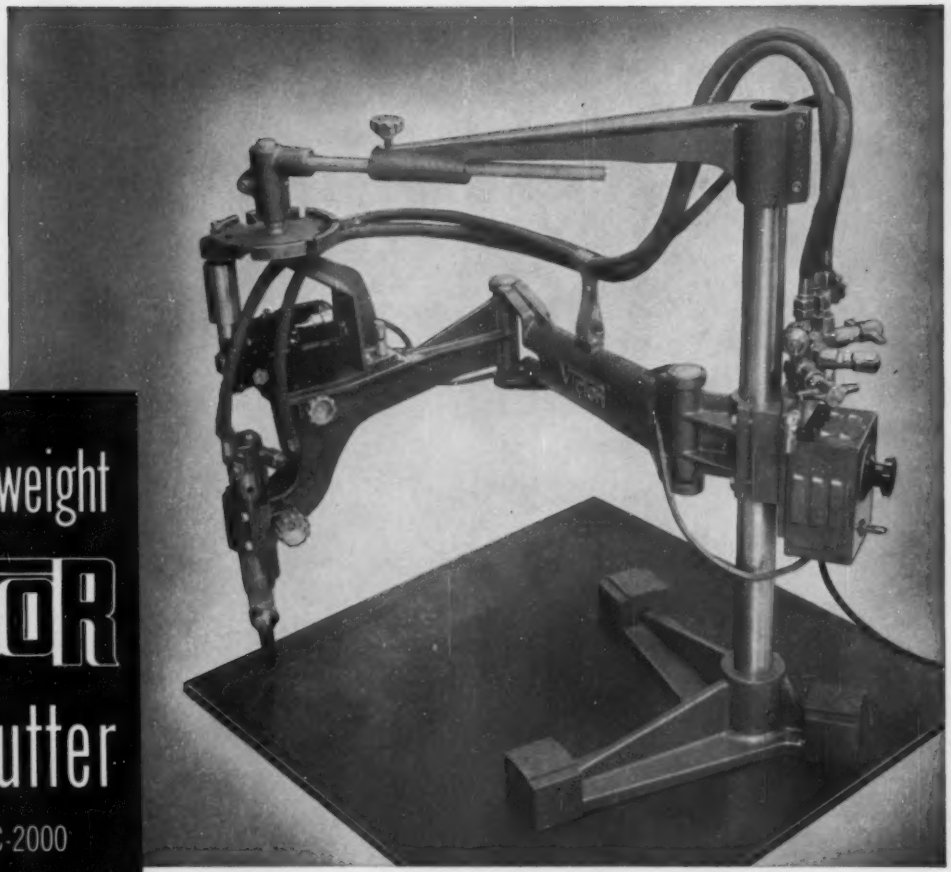
SQUARE D COMPANY

EC & M DIVISION • CLEVELAND 28, OHIO

New, lightweight

VICTOR Duplicutter

MODEL DC-2000



Portable Model DC-2000 cuts circles to 19½" diameter, rectangles to 12" x 35", and metals to 8" thick. Torch accommodates all Victor 1-101 and 1-100 cutting tips, through size 5.

Flame cuts parts accurately, saves handling and set-up time, increases labor efficiency.

This portable VICTOR DUPLICUTTER weighs only 36 pounds. Operator easily carries it to any work location in plant, field or warehouse . . . thus saving you time and cost of moving materials. Set-up takes minutes only. You lose no time leveling DUPLICUTTER—its magnetized feet use stock being cut as working base. And it's so simple one man easily handles production from 2 or 3 DUPLICUTTERS.

Precise controls and powerful, permanent magnet in template follower enable you to duplicate parts to production tolerances of plus or minus 1/64". Easy, quick interchange of templates makes DUPLICUTTER practical for both long production runs or duplication of single part.

Why not see for yourself how easily the VICTOR DUPLICUTTER handles, how fast and accurately it cuts? Call your VICTOR dealer NOW and ask him for a demonstration on your job . . . or write us for descriptive Bulletin 353.

For maximum efficiency and safety, use genuine Victor tips and parts

VICTOR for welding

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

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It's not always possible to launder *all* the chips or filings out of ordinary wiping material. Chips come back to scar men and metal, to plague your production line. This man has already had four wiper cuts.

He had 4 wiper cuts last month

They're easy to distribute . . .

They really soak up oil . . .

Always a clean one handy . . .

Just toss 'em in the trash . . .

Chips can't hide in a clean Scott Wiper. Each Wiper is brand new, fresh from the carton. A man takes a Scott Wiper as he needs it . . . uses it for his face, his hands, his product.

...He had none!

The difference is . . . Scott Wipers

This is sanitary wiping. A man uses a Scott Wiper thoroughly, throws it away—takes a new one. No danger of cuts from hidden chips . . . no fear of skin infection from dirty wipers . . . when you take a fresh wiper from the carton.

And because Scott Wipers are disposable you save in many other ways. Sorting and baling are eliminated. Handling and distribution are simplified. Laundering becomes a thing of the past.

Your local Scott representative or distributor is ready to demonstrate in your plant any time you say. Call him or mail this coupon right away.

Another quality product of . . .

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Scott Paper Company
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Please send me more information about Scott "Throw Away" Wipers.

Name_____

Company_____

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Check thermocouple circuits from your instrument panel during each heat. Save hundreds of hours inspecting and **needlessly** replacing thermocouples.

THERMOCOUPLE CIRCUIT
RESTORER
CUTS INSPECTION and REPLACEMENT COSTS

Listed below are some purchasers of the Restorer* and Leak-Checker.**

BELL ANNEALING FURNACE	Allegheny Ludlum Steel Corp. Rome Strip Steel Co., Inc. Sharon Steel Corp.
BOX ANNEALING FURNACE	American Chain Division American Chain & Cable Co., Inc. Frazer & Jones Co.
CONTINUOUS ANNEALING FURNACE	Damascus Tube Co. Washington Steel Corp.
SALTBATH	Aircraft-Marine Products, Inc. The Electric Auto-Lite Co. Black & Decker Manufacturing Co.
OTHERS	Battelle Memorial Institute Davison Chemical Company Div. of W. R. Grace & Co. Farrel-Birmingham Company, Inc. Ferriot Brothers, Inc. Johnson Bronze Co. United States Steel Corporation U. S. Atomic Energy Commission

***THE RESTORER** detects and corrects thermocouple circuit failure **during** any heat treating or melting operation.

****THE LEAK-CHECKER** detects leaks in thermocouple protection tubes immersed in saltbath or other melting furnaces.

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ELECTRONIC EQUIPMENT

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LARGE HEXAGONS

available NOW! . . in cold-drawn steel bars (GRADE C 1018) . . sizes to 4"

Yes, you can now buy cold-drawn hexagon steel bars in sizes up to and including 4". Effective immediately, LaSalle offers 3¼", 3½", 3¾" and 4" diameter hexagons . . in addition to conventional sizes ranging from ⅛" to 3".

No longer is it necessary to resort to costly and time-consuming forging, milling or other machining to produce large-size hexagons.

And with *cold-drawn* large hexagons you naturally get the superior mechanical qualities inherent in cold-drawn steel bars. Ask your steel distributor for Large Hexagons by LaSalle.

La Salle STEEL CO.

the Most Complete Line of Carbon and Alloy Cold-Finished and Ground and Polished Steel Bars in America.

For additional detailed information, send for your copy of this helpful new data sheet, "Large Hexagons."

LA SALLE STEEL COMPANY
1436 150th Street
Hammond, Indiana

Please send me Helpful Data Bulletin No. 14 "Large Hexagons"

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Company_____

Address_____

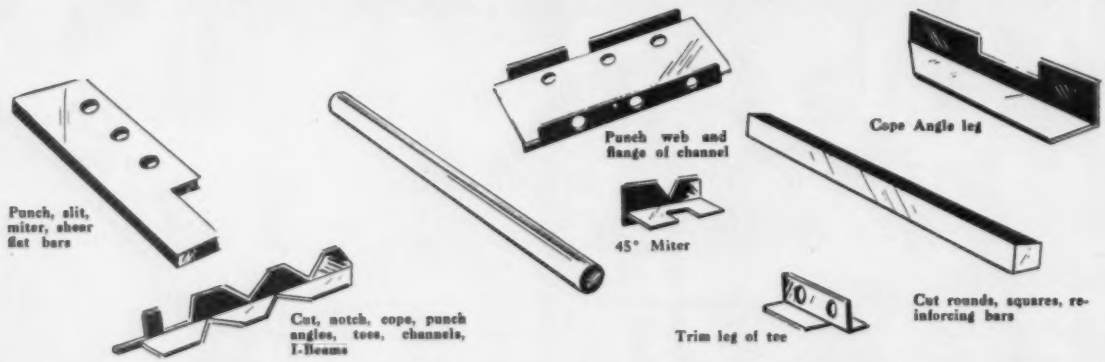
City_____ Zone____ State_____

IF YOU DO

1/2

OF THESE OPERATIONS

YOU COULD BE SAVING TIME, SPACE AND MONEY WITH A U.I.W.


Punch, slit, miter, shear flat bars
Cut, notch, cope, punch angles, tees, channels, I-Beams
Punch web and flange of channel
45° Miter
Trim leg of tee
Cope Angle leg
Cut rounds, squares, reinforcing bars

Yes, if your shop does only *half* the above fabrication jobs, a "Buffalo" Universal Iron Worker would pay for itself in a hurry. Three men can use it at a time—on three separate operations. It will do up to six operations without tool changes. The only machine with independent built-in notcher and coper, the U.I.W. also has punch head, shear, bar cutter and angle miter with quick pin adjustment. And for the largest capacity work, "Buffalo" also build Unistructural Iron Workers. All are built to the "Q" Factor* standard of strength, convenient handling and freedom from maintenance worries. Write for Bulletin 360-F today!

**The "Q" Factor—the built-in Quality which provides trouble-free satisfaction and long life.*

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

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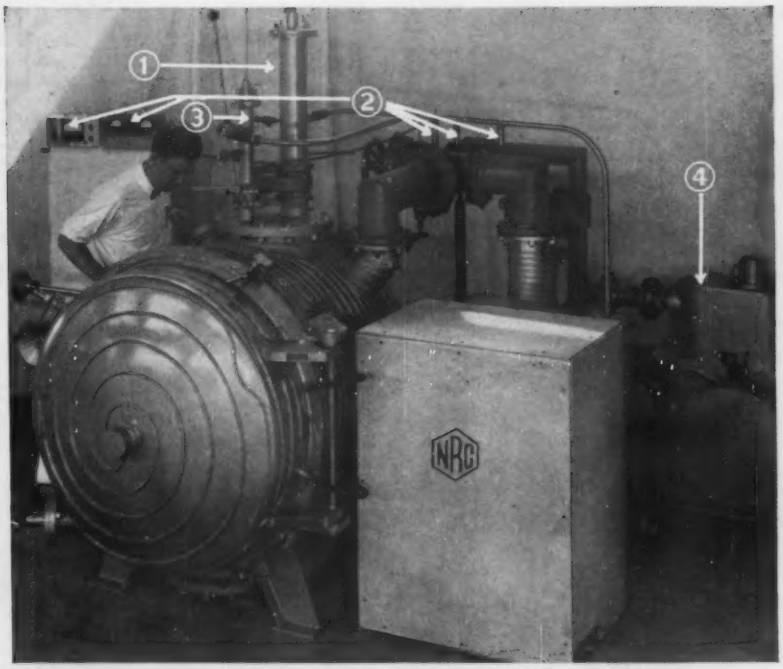
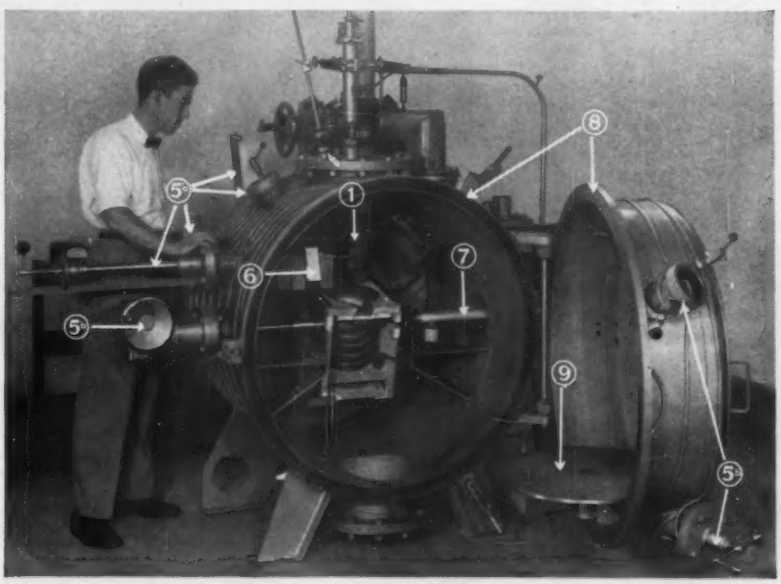
NRC Vacuum Furnaces

Save Laboratory Man-Hours

1. **Unique charging assembly and air lock** allow unlimited bulk additions without breaking vacuum . . . maximum use of crucible capacity.
2. **Gauging** . . . provides accurate, continuous pressure information . . . resists contamination . . . reduces maintenance.
3. **Immersion thermocouple** provides accurate temperature information — can be replaced without breaking vacuum.
4. **NRC Rotary Gas Ballast Pump** maintains high efficiency, fast pump-down time even on the muggiest days.
5. **Controls functionally grouped** at two floor-level operating positions speed (a) charging and melting . . . (b) mold positioning and pouring.
6. **Alloy charging containers** permit alloy additions in any order and at any rate.
7. **Coaxial feed-thru** minimizes power loss . . . eliminates explosion hazard . . . reduces maintenance . . . facilitates crucible changes.
8. **Horizontal tank with deep door** gives maximum accessibility, flexibility, ease of maintenance.
9. **Mold turntable** permits "split heat" alloy techniques, or casting varied size ingots from same heat.
10. **Rotary capacitance selector** (on control panel — not shown in pictures) facilitates matching capacitance to load.



Two views of NRC 50-lb. capacity Vacuum Induction Furnace Model 2555. National Research designs and manufactures induction, arc, or resistance vacuum furnaces for metal production, heat treating, investment casting, sintering, and brazing.



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NRC Vacuum Furnace Bulletin ☐ Have your representative call ☐

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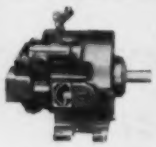
What's New in VICKERS HYDRAULICS

Illustrated here are new and recently improved units added to Vickers most complete line of oil hydraulic equipment. Look to Vickers as a single responsible source for integrated hydraulic systems. For characteristics of any of these components, please write for Installation Drawings by number.

SERIES TB PIPELESS POWER PACKAGE consists basically of electric motor, hydraulic pump, control circuit and reservoir. Available in 3 circuits, 3 pump sizes and 3 electric motor sizes. Inst. Dwgs. 178706, 7 & 8.

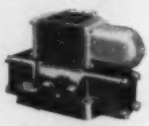
V-LINE PISTON PUMPS AND MOTORS for 5000 psi. Unique design minimizes relative movement between rotating parts, provides increased bearing surfaces and reduces complexity of parts. Result is improved efficiency, longer life, and reduced maintenance. Supplied with straight thread connections. Bulletin 55-72.



Variable Displacement Pump With Servo Control. Inst. Dwg. 179061. Also available with pressure compensator control. Inst. Dwg. 179060.

Constant Displacement Fluid Motor. Inst. Dwg. 179059. Available also is a Constant Displacement Piston Pump. Inst. Dwg. 179058.

DG4S4 ⅜" solenoid operated. Inst. Dwg. 182412. ¾" available later.



DG5S4 ¾" solenoid controlled pilot operated. Inst. Dwg. 182413. 1¼", 2", 3" available later.

SOLENOID OPERATED 2- AND 4-WAY VALVES with many improved features. (1) Integral junction box (2) covers that retain the solenoids and (3) manual operation for testing. Compact and versatile. Gasket mounting simplifies installation and overhaul . . . also minimizes piping.

TRAVERSE AND FEED CYCLE CONTROL PANEL Improved design. Provides any cycle sequence of rapid advance, adjustable feed, dwell and rapid return motions. Maintains smooth and constant preset feed rate (either one or two) regardless of fluctuations in cutting tool resistance or hydraulic pressure.

CPP-2242 Solenoid Controlled. Pilot Operated (gasket mounted) provides smooth, low current operation. Inst. Dwg. 182414.

CG-03 Relief Valve (gasket mounted). Subplates available with pipe or straight thread connections. Inst. Dwg. 175630. CS-03 available with straight thread connections. Inst. Dwg. 175629.

CO2 Reciprocating Cycle Control Panel For Gasket Mounting. Inst. Dwg. 177083.

4CG-03 Pilot Operated Check Valve, gasket mounted. Inst. Dwg. 135468.

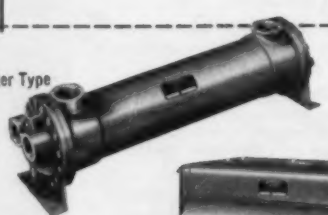
CG-714 Deceleration Valve, gasket mounted. Inst. Dwg. 172902.

CGV-06 5000 psi Relief Valve gasket mounted with straight thread connections. Inst. Dwg. 177609.

URG1 Unloading Relief Valve, gasket mounted. Inst. Dwg. 178974.

SG1 Pressure Switch, gasket mounted. Inst. Dwg. 172538.

Water Type



OIL COOLERS
Vickers Oil Coolers are characterized by their very high rate of heat transfer per unit of space occupied. Bulletin 55-69.

Air Type

For further information on any unit shown, ask for Installation Drawing by number indicated. 7433

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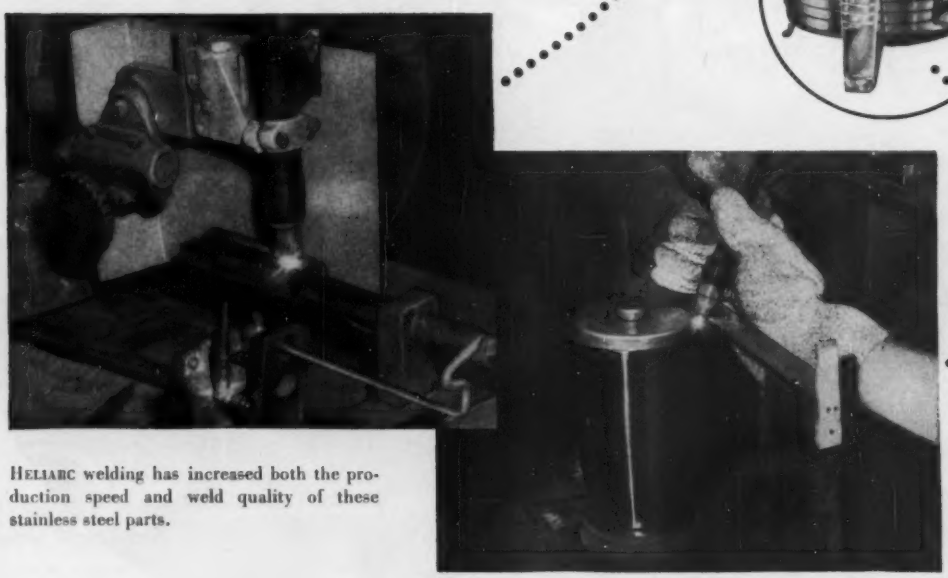
ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

GAIN NEW SPEED AND WELD QUALITY

in light-gage metal fabricating



HELIARC welding has increased both the production speed and weld quality of these stainless steel parts.

Throughout industry, from production line operations to one-of-a-kind jobbing, HELIARC argon gas-shielded welding is helping fabricators gain new top weld-quality and production speed. These typical pictures show how HELIARC welding is used to efficiently fabricate sections of the Cory "Crown Jewel" percolator.

SETUPS DESIGNED TO FIT JOB NEEDS

These .031 in. type 302 stainless steel parts are fabricated in two fast, efficient operations. A mechanized HELIARC torch is used to butt weld a seam in the percolator's spout —and a stationary HELIARC torch welds the bottom section to the unit's body while parts rotate.

WELDING IS FAST, WELDS ARE SOUND

It takes only a few seconds to complete a 4½-in. long butt weld in the percolator spout. In the second HELIARC welding setup, a 17-in. circumferential weld on the percolator bottom is completed in only a fraction of a minute.

WIDE RANGE OF EQUIPMENT AND APPLICATIONS

HELIARC welding setups are available for manual, semi-automatic, and automatic operations. All are ideal for a wide range of light-gage metal jobs. Call your local LINDE representative and find out which HELIARC welding apparatus is best suited for your fabricating needs. Start saving now—call today.

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A Division of Union Carbide and Carbon Corporation

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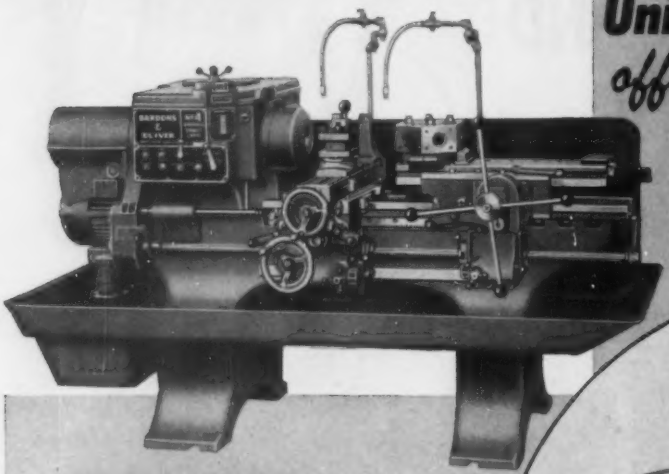
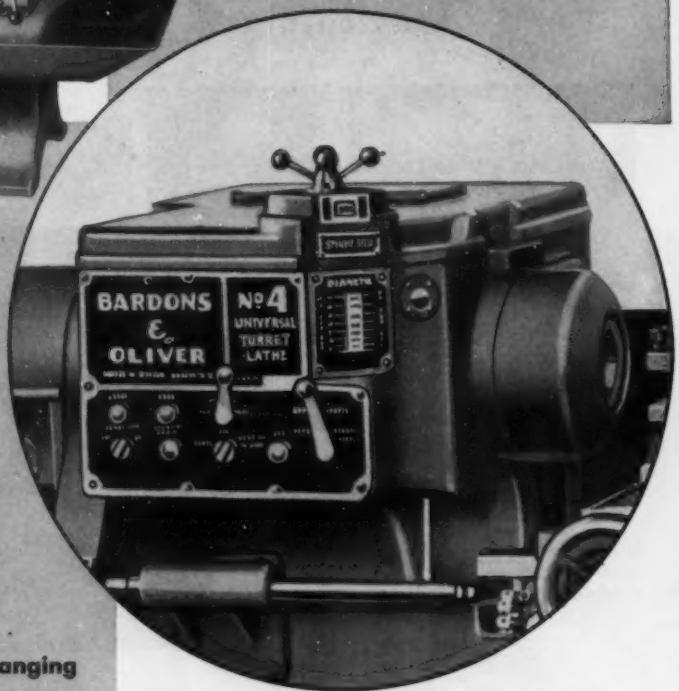
The BARDONS & OLIVER No. 4 Universal Turret Lathe offers these outstanding HEADSTOCK Features





- Sixteen geared spindle speeds, providing a fifty to one speed range
- Optional spindle speed ranges with maximum up to 2000 R.P.M.
- Constant horsepower (optional to fifteen) at all spindle speeds
- Fast operating and effortless electric headstock clutches
- Fully automatic spindle speed changing in less than two seconds
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- All headstock gears of alloy steel, flame hardened and precision finished

- Headstock shafts of alloy steel, heat treated, ground-in-spline, of large diameter and short span between bearings
- All rotating assemblies statically and dynamically balanced
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The complete line of Bardons & Oliver Turret Lathes offers many outstanding features. Write us on your company letterhead for specific model information or send your blue prints for a proposal.

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When you cut metal!
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Always specify Victor Blades for hand and power saws. It won't take long for you to see the difference . . . on the production line *and* on the cost sheets!

Because Victor Blades are made better — to give you what you need for efficient, low-cost, high-speed operation. Victor Blades provide uniformity, proper hardness, efficient tooth design . . . *plus* the convenience assured by ample set for clearance and clear, easy-to-read markings. These things add up to the reason why Victor is the best blade buy — everywhere!

REMEMBER THESE 5 VITAL COST-CUTTING POINTS WHEN YOU ORDER SAW BLADES:

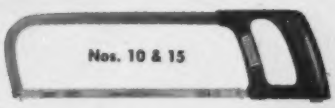
1. **UNIFORMITY** — Quality must be consistent . . . in *every* blade.
2. **HARDNESS** — Blades must be heat treated and tempered to the proper degree.
3. **EFFICIENT TOOTH DESIGN** — For fast and efficient cutting.
4. **BALANCED SET** — For clearance and accuracy of cut.
5. **CLEAR MARKINGS** — For easier, quicker identification.

AND REMEMBER:
VICTOR GIVES YOU ALL 5!

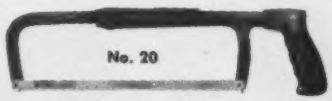
VICTOR

SAW WORKS, INC. • MIDDLETOWN, N.Y., U.S.A.
Makers of Hand and Power Hack Saw Blades, Frames and Metal and Wood Cutting Band Saw Blades

3600



No. 10 — Yellow molded handle. Shaped for comfort. Almost indestructible!
Patented Lever-Lock positions, tensions blades *automatically*. **No. 15** — Red molded handle, chrome-plate finish. Same features as No. 10.



No. 20 — Gunmetal Finish, features adjustable pistol-grip Frame, Lever-Lock for extra-easy blade change.

FREE — FOR THE SHOP . . . the Victor Metal Cutting Chart — an invaluable on-the-spot guide for shop metal workers.

FREE — FOR YOU . . . Victor's Handy METAL CUTTING GUIDE . . . packed with valuable information on blade types, cutting techniques . . . feeds and speeds . . . plus important general metal cutting information.

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☐ Please send me the Victor Metal Cutting Chart
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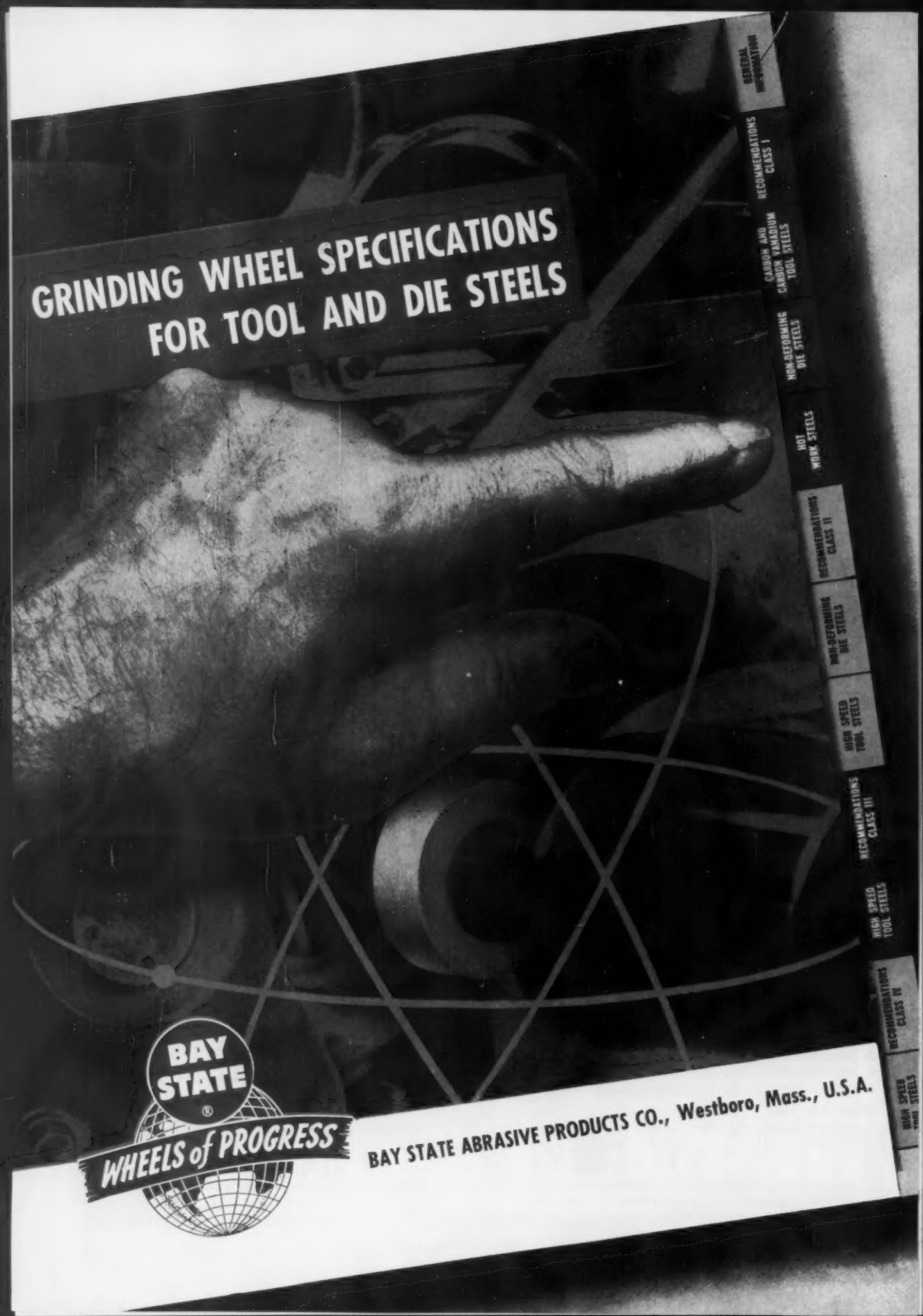
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. . . to Increase Production While Lowering Your Over-All Costs

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Satisfied users of Youngstown Sheets and Strip report:

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Our District Sales Office is as near as your telephone; why not call today?

Youngstown

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*Reg. trademark, Crucible Steel Company of America.

How can shell molding help YOU?

General Electric offers a number of products to help foundrymen get maximum benefits from the shell process: *G-E phenolic shell-molding resins* to form light, dimensionally accurate molds . . . *G-E silicone release agents* to free molds easily from patterns . . . *G-E phenolic bonding resin* to cement shell halves together.

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Ask G. E. about shell molding!

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Handles every type of electrode...

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Some rods that work best on DC in smaller sizes... DC

work best on AC on the larger sizes. AC

IDEALARC

with its instant selection of AC or DC gives optimum performance *on every type and size electrode.*

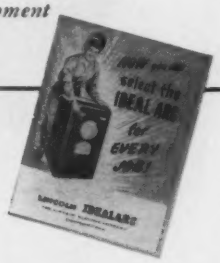
There's no other welder like Idealarc.

THE LINCOLN ELECTRIC COMPANY

Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

© 1956 The Lincoln Electric Company



THE LINCOLN ELECTRIC COMPANY
Dept. 1522, Cleveland 17, Ohio

☐ Send me Bulletin 1343 on Idealarc.
☐ Have representative call.

Name_____

Position_____

Company_____

Address_____

City_____ State_____

STABLE ACCURACY

THE MOST IMPORTANT REQUIREMENT IN GAGING

The basic design of the Dimensionair is different from that of any other Air Gage. It "repeats" measurements precisely and constantly hour after hour because —

1. The Dimensionair's balanced air system *cancels out pressure variations* which might affect it and cause errors.

2. Unlike other air gages, there is no adjustment in the magnifying-measuring side of the system. Rather than introduce a variable here which would make a fixed system impossible, Federal offers two magnifications which answer practically every requirement. These magnifications are 2500 to 1 and 5000 to 1. In this way, *Federal achieves a stability which cannot be approached by other air gages.*

3. Because the magnification is fixed, the *scale is linear* and the graduations can be accurately calibrated.

4. Hence, with no adjustment to change the magnification and affect the stability, only a single master is required.

Try It!

Check a Dimensionair yourself right in your own plant. Compare it with your present air gages.

a. **Check it for stability** or "repetition". Do this frequently and over long intervals, always using the same master. Avoid temperature effects (excessive handling, direct sunlight, etc.). Notice how quickly you can set the gage to zero.

b. **Check its calibration** using any number of masters. Confirm the fact that only one master is needed. See how dependable the Dimensionair really is.

Ask us or our salesmen to let you try a Dimensionair

Federal Products Corporation
6139 Eddy Street, Providence 1, R. I.

Ask **FEDERAL** *First*

FOR RECOMMENDATIONS IN MODERN GAGES . . .
Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging

Saves Time... Cuts Costs

Rotary Planer . . . do milling jobs in one-third to one-seventh of time on an Espen-Lucas Rotary Planer.

Big Sawing . . . production cutting of large stock —rapid, easy, straight-to-a-line piece after piece—on Espen-Lucas Cold Sawing Machines.

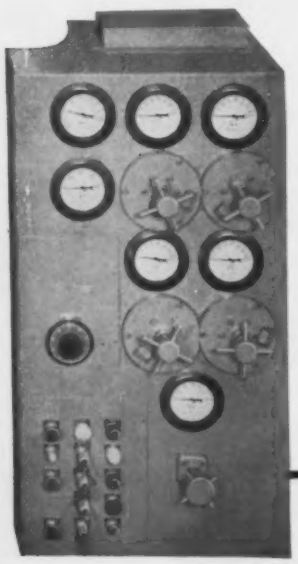
The **ESPEN-LUCAS** *Machine Works*

Front Street and Girard Ave., Phila. 23, Pa.

BUILDERS OF LARGE COLD SAWING MACHINES • ROTARY PLANERS • COLUMN FACERS • HEAVY TYPES OF SPECIAL MACHINERY

Farquhar... the first triple-acting press with electric magnetic controls...

EVERY ADJUSTMENT of speed, timing and pressure is made by the operator on this Control Panel without leaving his operating station. It is no longer necessary for him to climb to the top of the press for this purpose.



...the only press that can do so many things so well

THIS hydraulic press revolutionizes the high speed production of draw-formed parts. We believe that it has rendered obsolete every double-acting and triple-acting press now in service. These are challenging statements... *but read the facts.*

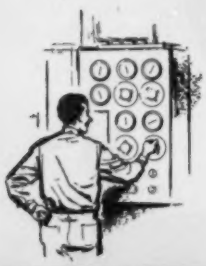
A. B. Farquhar Division, The Oliver Corporation
Press Department, York 23, Pennsylvania

OLIVER

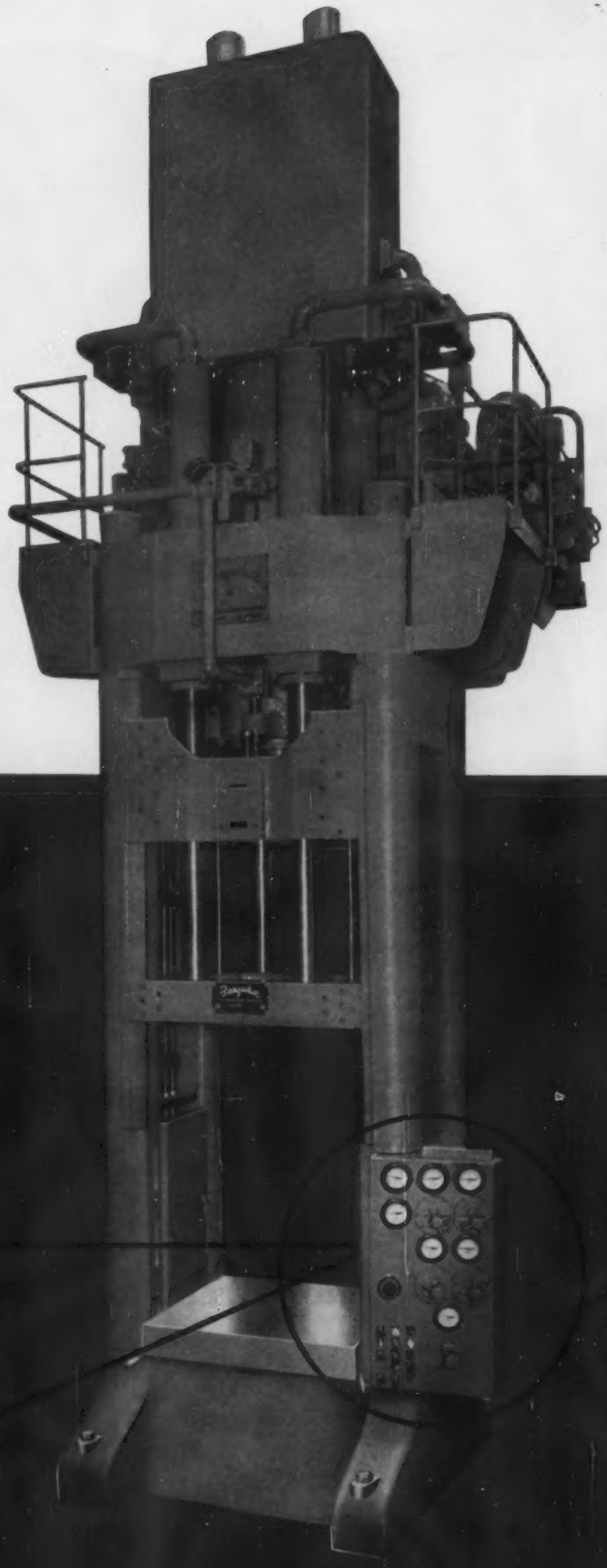
Farquhar PRESSES

DRAWING • FORMING • FORGING • STRAIGHTENING • BENDING

- **Unlimited speed changes** now possible at any point in the cycle. This means, for example, that the ram can approach the draw at maximum speed, slow down as it enters the draw, change speed in the middle of the draw, strip slowly and return to up position at maximum speed.
- **Draw-forming of difficult materials** is thereby greatly simplified and improved. The exact speed can be selected which is best suited to the characteristics of the material at any point in the stroke.
- **Expensive dies** can be given added protection by "gentle" treatment at point of contact and withdrawal.
- **Cycle time is greatly reduced,** because maximum speeds can be attained at every desired point in the cycle.



- **No expensive cams** with time-consuming adjustments are needed to obtain these results. All speed changes are made by dial settings on the control panel.



- **4-point adjustment of blank holder pressure** is made by operator without leaving operating station, an important device in the draw-forming of eccentric shapes. This has been a feature of Farquhar Double-Acting Presses in the past. It is an important feature of the new Farquhar Double and Triple-Acting Presses, too.
- **Best of all,** with these additional advantages, the Farquhar Double and Triple-Acting Presses are competitively priced!
- **For a more complete description** of these new Farquhar Presses with electric magnetic controls, write for Bulletin A-200. Please use your company stationery. A. B. Farquhar Division, The Oliver Corporation.

Speeds are pre-set by these radio-type dials which can be located within the main control panel or in a remote position.

FORCING • ASSEMBLING • EXTRUDING • AND OTHER OPERATIONS.

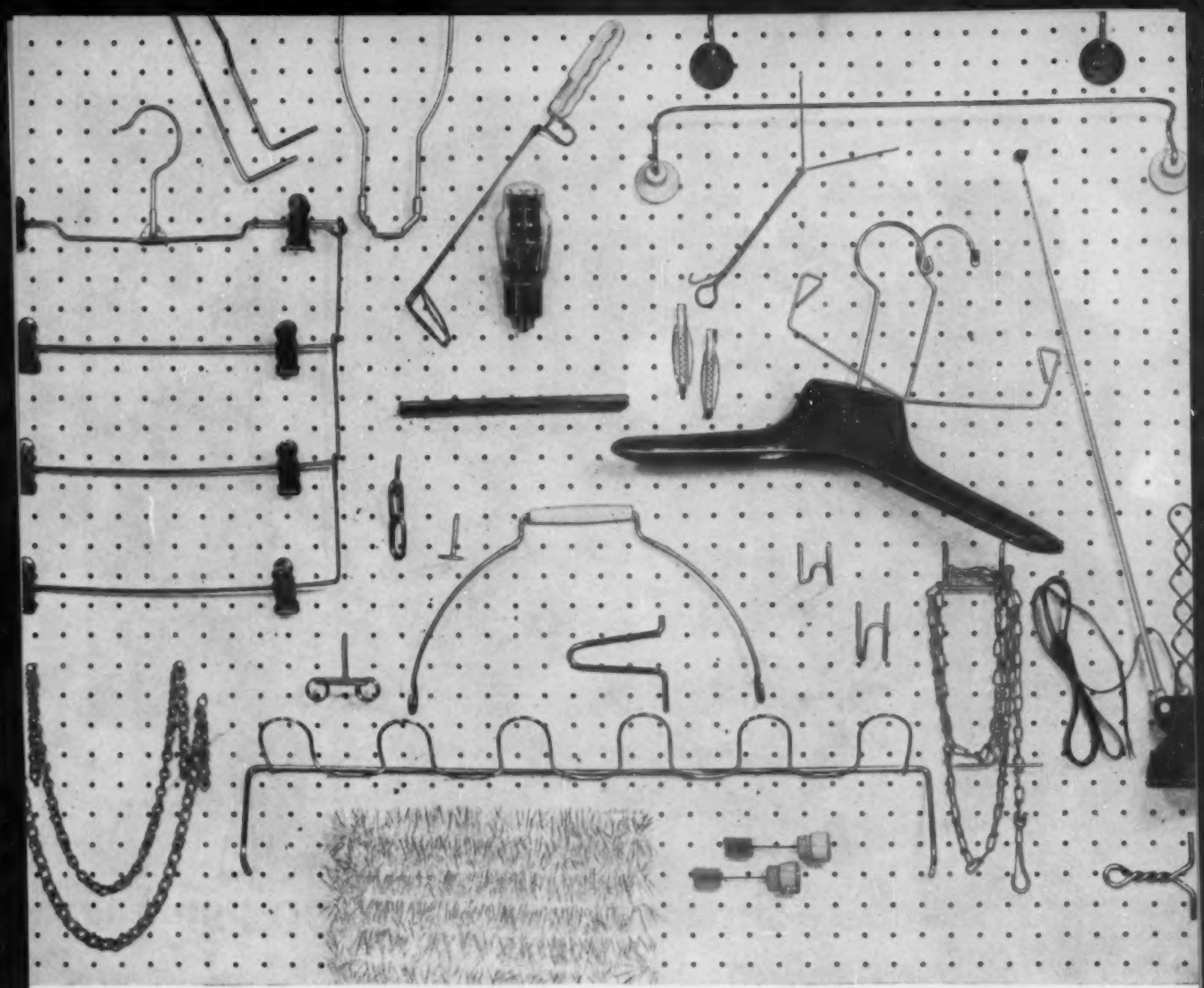
PICKER . . . your ONE stop

for every need in industrial radiography

PICKER X-RAY CORPORATION, 25 SO. B'WAY, WHITE PLAINS, N. Y.

BRANCHES IN PRINCIPAL CITIES IN U.S.A. and CANADA

Picker x-ray



How these products were improved and costs lowered . . . with **NICKELPLY*, BRASSPLY*** and **COPPERPLY*** wire!

● National-Standard Nickelply, Brassply and Copperply is electro-jacketed steel wire—a new development offering important advantages to manufacturers and users of wire forms and components. Specifically . . . . .

The jacket metal, precisely concentric and to the required thickness, *is inseparably bonded to the steel wire.* The materials can be severely formed, twisted, swaged, welded, roll threaded or redrawn without fracturing the jacket metal or otherwise exposing the base metal. Thus these new materials can often replace solid nickel, brass or copper wire, or can eliminate the costly post-plating of steel wire forms . . . and with unmatched assurance of coating coverage! Advantages in strength, durability and economy are obvious.

Nickelply, Brassply and Copperply are now available commercially in diameters up to .340". Pertinent data on coating weights, strengths, finishes, base materials, corrosion resistance, etc., are given in Bulletin K-10. Why not send for it now and explore these new possibilities?

*Trade Mark National-Standard Company

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape

ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel

REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth

NS NATIONAL-STANDARD Company NILES, MICHIGAN

WAGNER LITHO MACHINERY DIVISION • JERSEY CITY, N. J.
Special Machinery for Metal Decorating

WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

Inspector checks shipment of Johnson bushings at Miller plant. Rejection rate is almost nil, despite tolerances as close as .0005".

Assemblyman slips Johnson bushing on shaft of Miller Fluid Power cylinder. Note the convenient packaging of the bushings.

Johnson Helps Miller Fluid Power Provide Leakproof Seals At 3000 PSI

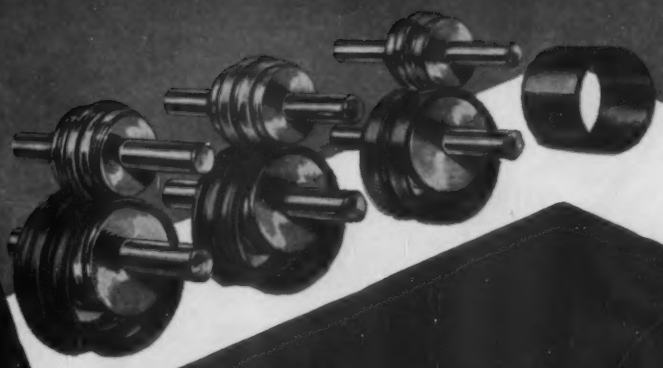
Miller Fluid Power Division, Flick-Ready Corp. has been highly successful in designing and building hydraulic cylinders which are leakproof over a range of pressures from four to 3000 psi. Founded in 1903 as a maker of marine engines and custom machinery, Miller started making hydraulic cylinders immediately after the last war. During the intervening ten years Miller's growth has been phenomenal.

Contributing to the high quality of the Miller cylinders are Johnson bushings which are made to Miller specifications. "The consistent delivery of high quality, exceedingly low rejection rate Johnson bushings is especially important to an expanding firm like ours," says Mr. L. J. White, Assistant Purchasing Agent. "The Johnson achievement is tremendous when you consider that our production rates are growing constantly, and that we require aircraft tolerances on six very critical dimensions. We have been very well satisfied with Johnson's ability to meet Miller's rigid specifications."

The Johnson Bronze Company would be glad to work with any manufacturer in the design and production of special bushings and bearings. The superior type of service given Miller Fluid Power is the standard of Johnson performance. If you have a bearing problem, we can provide the solution. We have over 2000 stock items and facilities for producing any custom design. For complete information on our standard products and the services offered by our Product Engineering Dept., write Johnson Bronze Company, 505 S. Mill Street, New Castle, Pa.

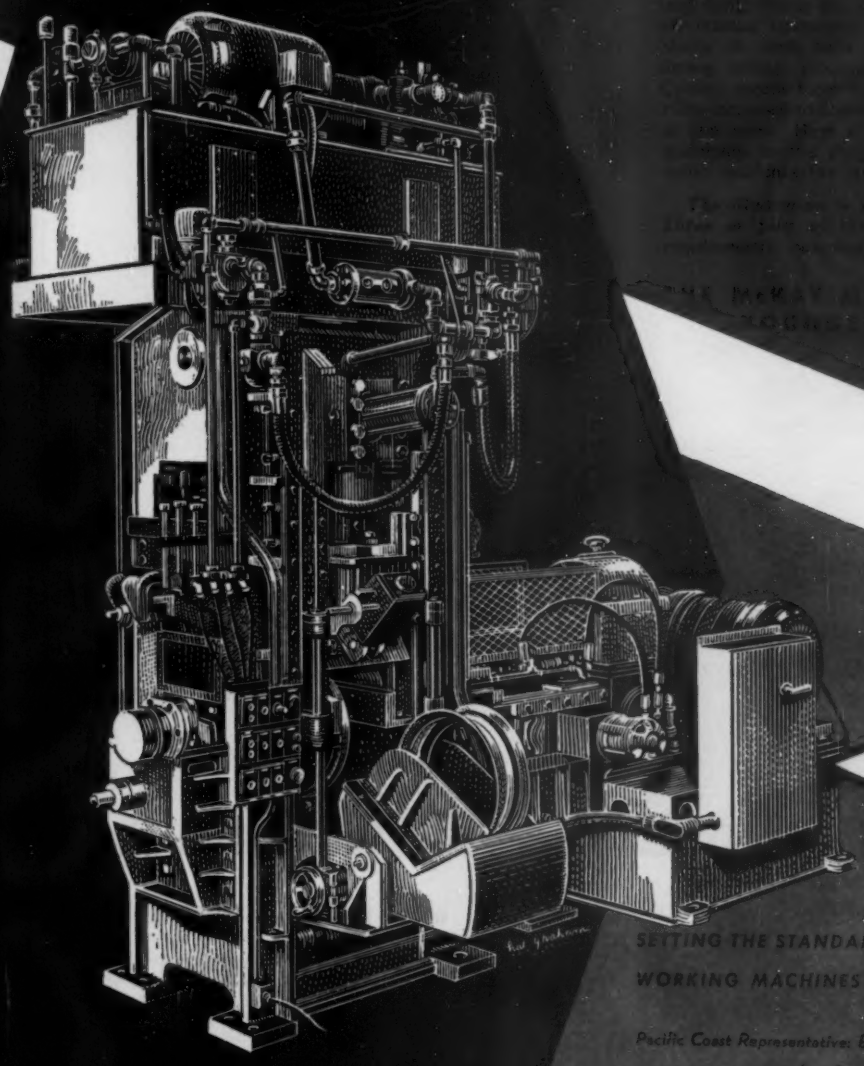
Johnson Bearings

LEDALOYL • ALUMINUM ON STEEL • BRONZE ON STEEL • STEEL AND BABBITT • CAST BRONZE
(powder metallurgy)



McKay's

Automatic Rim Roller Line...



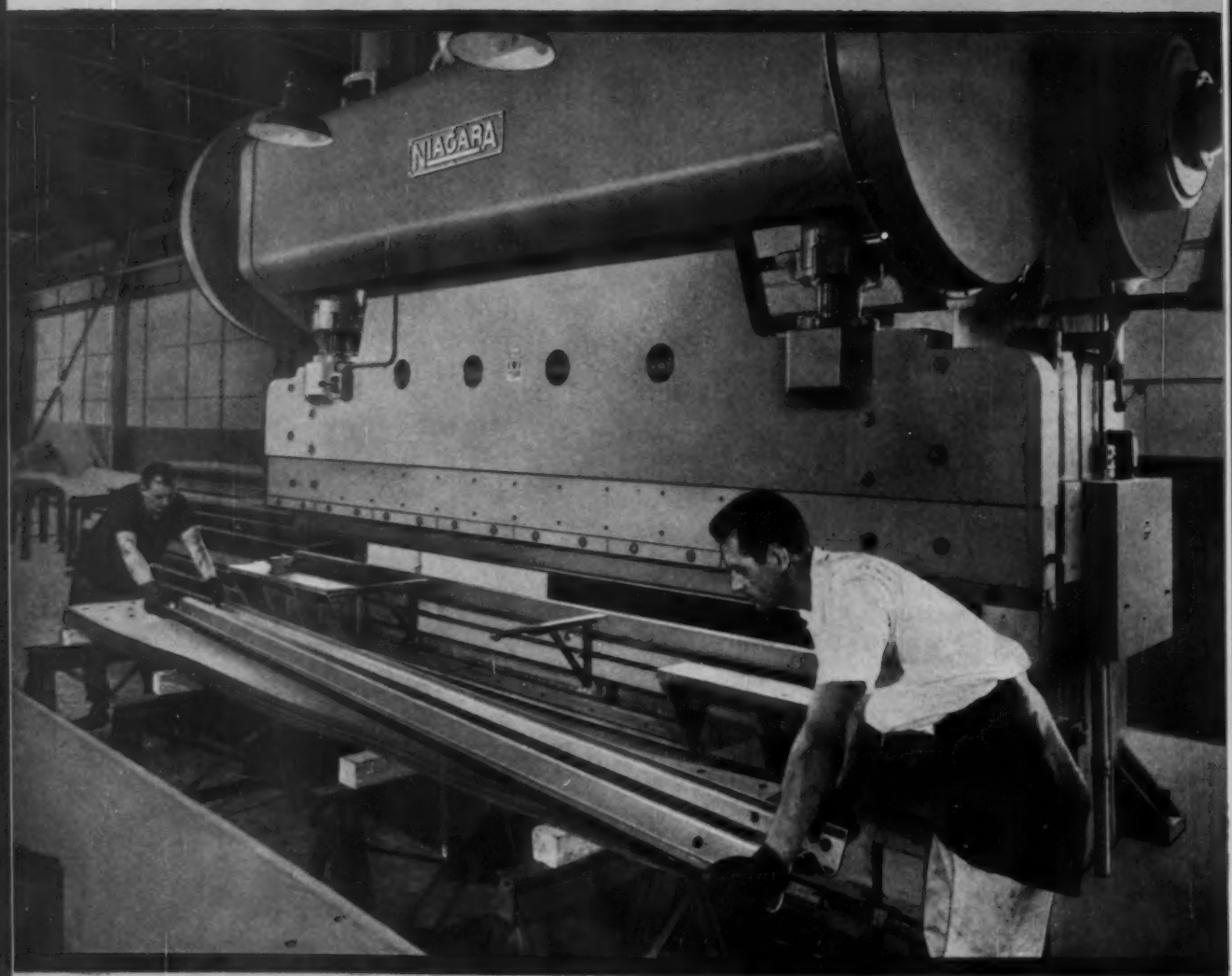
THE McKAY MACHINE COMPANY
YOUNGSTOWN, OHIO

McK

SETTING THE STANDARDS OF QUALITY IN METAL WORKING MACHINES FOR TWO GENERATIONS

Pacific Coast Representative: ENGEN INDUSTRIAL COMPANY
Los Angeles, California

"we go back to



(Above) Forming highway guard rails from 12 gage steel on Niagara 520 Ton Press Brake.

(Right) Piercing rails with same machine.

(Far Right) Forming chair seat frames for office furniture from 20 gage steel on Niagara 150 Ton Press Brake.

Niagara for Press Brakes"

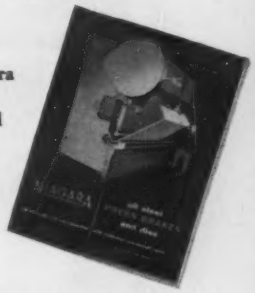
"The personnel of our organization has been acquainted with Niagara equipment for years. Niagara will stand behind *any* equipment furnished. Many millions of operations in the past 5 years on their presses and press brakes... equipment satisfactory from both the operational and safety standpoint. Our intention is to use the Niagara line entirely."

There in the words of one customer (a large Ohio metal fabricator whose press brake operations are illustrated), you have the sentiments of hundreds. Once experienced with *any* of the other metalworking machines which Niagara makes... presses, shears, bending rolls and dozens more... one just naturally thinks first of Niagara whenever the subject of press brakes comes up.

REASONS ARE MANIFOLD: (1) Extreme helpfulness of Niagara's engineers in selecting the machine and accessories that will do the job best (no other manufacturer can offer so complete and large a line of sheet and plate metalworking equipment). (2) Unrivaled reputation and experience in the field, dating back 77 years, that assure unquestioned reliability. (3) World-wide recognition for design leadership, combining rock-bottom operating economy and top-notch performance in *every* product it makes (take a moment to run down this partial list of imposing press brake features):

- *Double end twin drive with double reduction gearing for smooth, uniform application of power at both ends of ram.*
- *Rugged, all-steel frames with box type crowns of unequaled strength and rigidity.*
- *Extra heavy, rigid bed and ram for maximum support of dies.*
- *Gearing totally enclosed in sealed oil baths for thorough, clean lubrication.*
- *Longer lasting, laminated, nonmetallic ways.*
- *Powerful, smooth-acting, multiple disc clutch and brake.*
- *Gibs maintain accurate, endwise alignment of ram.*

Standardized in a complete line, ranging from 50 through 775-ton capacities, Niagara Press Brakes are built to produce a tremendous variety of work uniformly and accurately. Post yourself now on all the details by requesting Bulletin 89 D and, as soon as you can, avail yourself of some really worthwhile suggestions from a Niagara representative. Write.



NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N.Y.

DISTRICT OFFICES:

Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia

Distributors in principal U.S. cities and major foreign countries

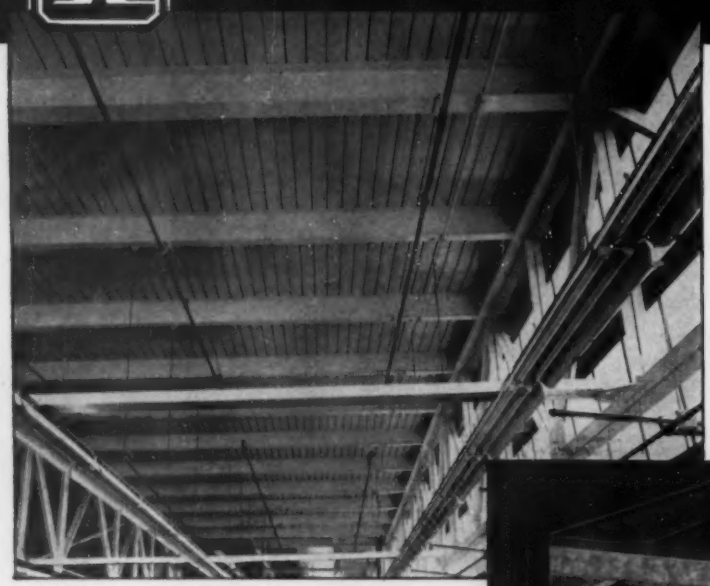
America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work

NIAGARA PRESS BRAKES

K & R

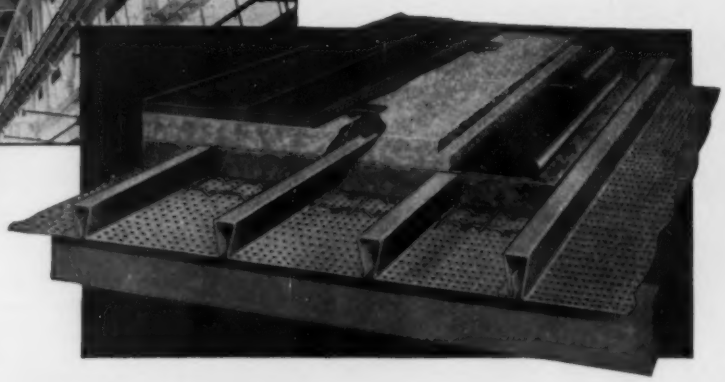
"...satisfactorily produced millions of feet of Holorib roofing", says Mr. N. E. Hubbell

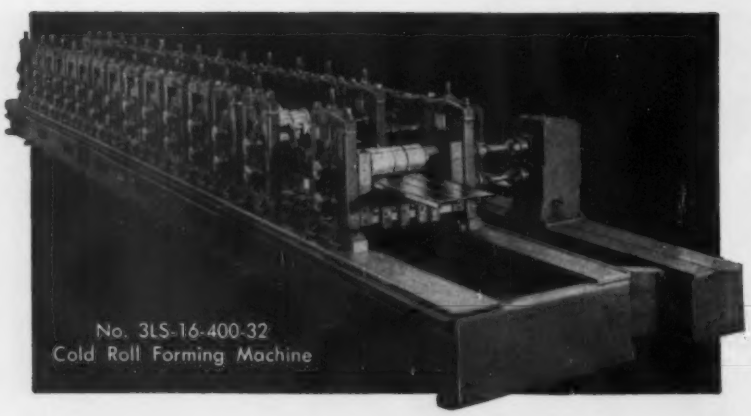
Buffalo Plant Mgr.
Detroit Steel Products Company



"Since 1930 Kane & Roach machinery has satisfactorily produced millions of feet of Holorib roofing — a section which cannot be easily roll formed. When our production increased we called on K & R in 1946 to furnish additional equipment."

Shown above: Installation of
Fenestra Acoustical Holorib Ceiling





No. 3LS-16-400-32
Cold Roll Forming Machine

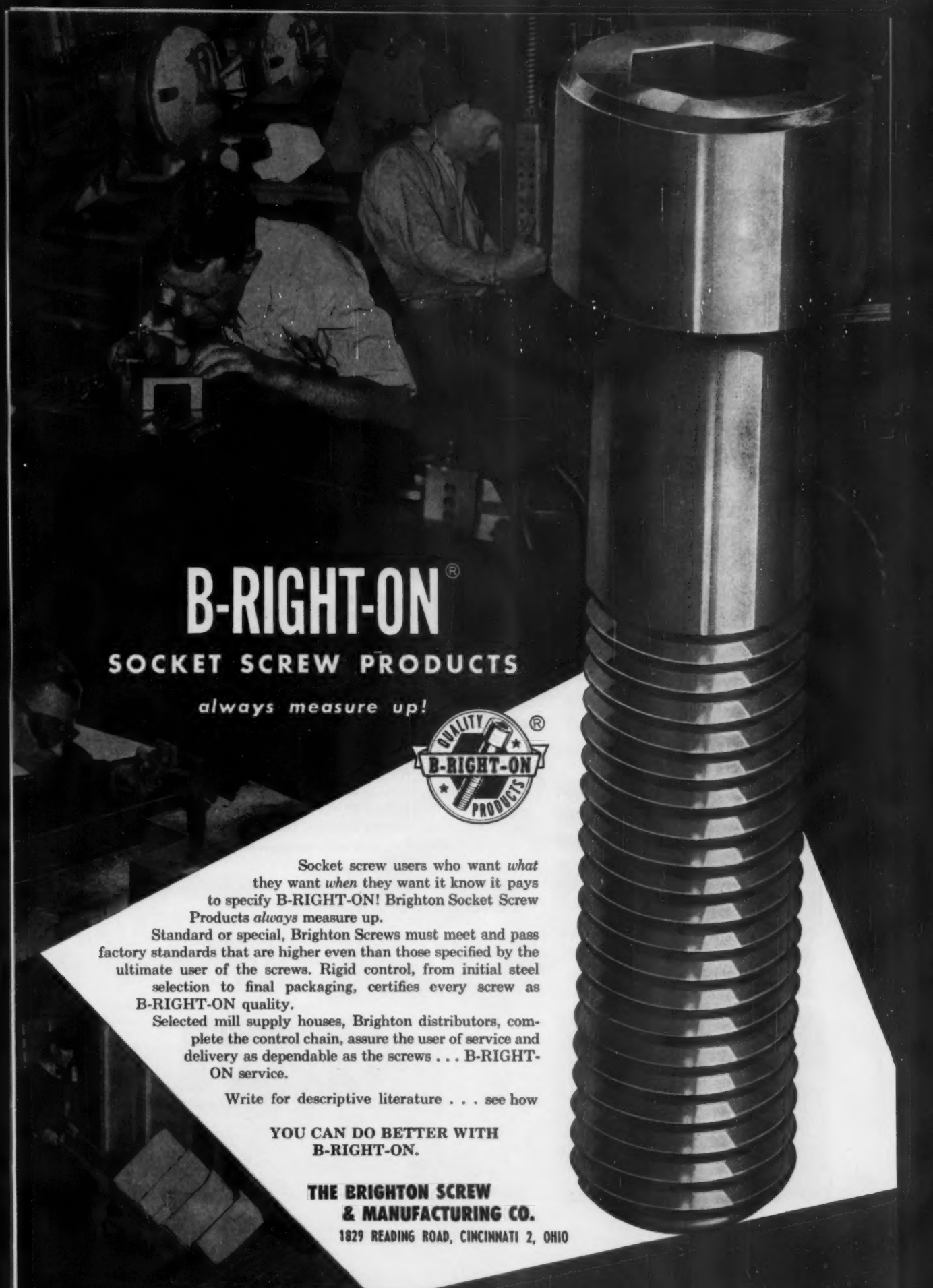
Millions of feet of easily-erected Fenestra roof ribbing have been handled rapidly and accurately on Kane & Roach machines. Nominally rolled from 18 gauge coiled stock the machine forms both plain and perforated sheets. A flying cut off is employed at the discharge end permitting continuous operation of machine in cutting lengths to meet customers' specifications.

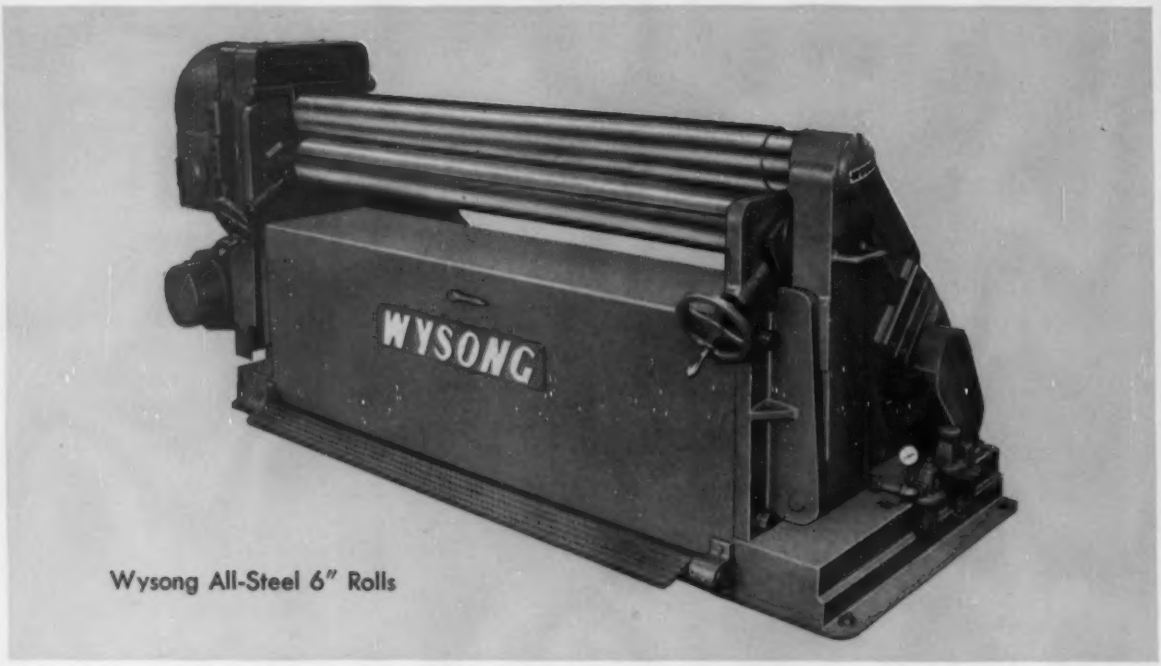
Write or wire us today. Our production-tailored engineering can help you cut costs and up production in your plant.

Kane & Roach

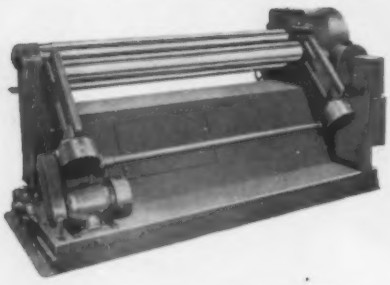
INCORPORATED

SYRACUSE, NEW YORK • ESTABLISHED 1887

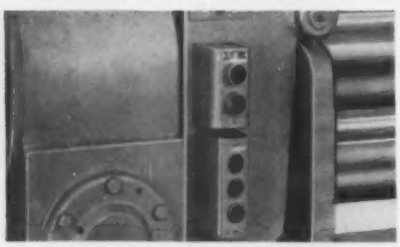

B-RIGHT-ON®
SOCKET SCREW PRODUCTS
always measure up!
QUALITY
B-RIGHT-ON
PRODUCTS
Socket screw users who want *what* they want *when* they want it know it pays to specify B-RIGHT-ON! Brighton Socket Screw Products *always* measure up.
Standard or special, Brighton Screws must meet and pass factory standards that are higher even than those specified by the ultimate user of the screws. Rigid control, from initial steel selection to final packaging, certifies every screw as B-RIGHT-ON quality.
Selected mill supply houses, Brighton distributors, complete the control chain, assure the user of service and delivery as dependable as the screws . . . B-RIGHT-ON service.
Write for descriptive literature . . . see how
YOU CAN DO BETTER WITH B-RIGHT-ON.
THE BRIGHTON SCREW & MANUFACTURING CO.
1829 READING ROAD, CINCINNATI 2, OHIO



Wysong All-Steel 6″ Rolls



Rear view. Motor at left provides power for adjustment of rear roll. Air vitalizer section of air operation of drop end is shown on left end.



Top push button panel controls rear roll. Lower panel provides stop, start and reverse for roll drive.

Hand lever controls air valve for lifting top roll.

New WYSONG All-Steel 6-INCH ROLLS

Wysong All-Steel Bending Rolls have created a *new* standard for safety and ease of operation. They are available in 4¼ inch, 5 inch and 6 inch diameters and working lengths from 36″ through 120″.

Wysong rolls are of the initial or pinch type. High production and safety features include:

- Single hand wheel for parallel adjustment of rear roll (power adjustment with ¾ HP magnetic brake motor optional on 6″ series.)
- A single lever to release drop end. Lowering drop-end raises top roll. (Air power operation optional on all models.)
- Safety treadle extending full length. Stepping on treadle stops machine.
- 7½ H.P., 1800 R.P.M. drive motor (magnetic brake motor optional.)
- Worm gear drive runs in oil.
- Accurately machined, alloy steel rolls, grooved to buyers specifications.
- Easy-to-read, roll-setting indicator scales.

See your dealer or write to factory for full information. Wysong also builds power, air-power and foot-power squaring shears and hand-operated slip roll formers. Wysong & Miles Co., Greensboro, N.C.

WYSONG

"Buy a Wysong . . . It's Miles Ahead"

NEW PORTABLE NIBBLER

CUTS CORRUGATED STEEL WITHOUT DISTORTION!

NEW AIR-POWERED PORTABLE NIBBLER

WIRE • PHONE • WRITE
for complete information

the ONLY PORTABLE NIBBLER that CUTS

10 Gauge Steel

Model HN-C for 10 gauge Stainless Steel and 8 gauge Mild Steel. 6" radius.

Without Distortion!

A big statement ... and only Fenway can make it! Our portable Nibblers have solved unusual problems for hundreds of users. Complete line includes the 14 gauge Nibbler and a light-duty 18 gauge Nibbler, and a special 90° head for each.

RCA—DU PONT—GENERAL MOTORS—and many others, use Fenway Portable Nibblers!

PAT. #2278174 #2278311 #2535631

Model MN-C for 14 gauge Stainless Steel and 13 gauge Mild Steel. 1" radius.

ALSO AVAILABLE: CORRUGATED, JIGSAW ASSEMBLY & AIR TOOLS

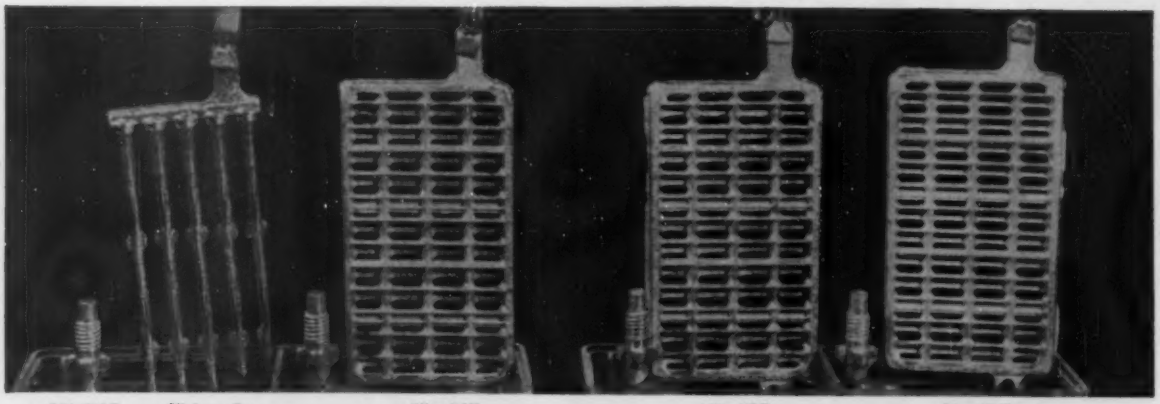
FENWAY MACHINE COMPANY

Edgemont & Clementine Sts.
Philadelphia 34, Penna.

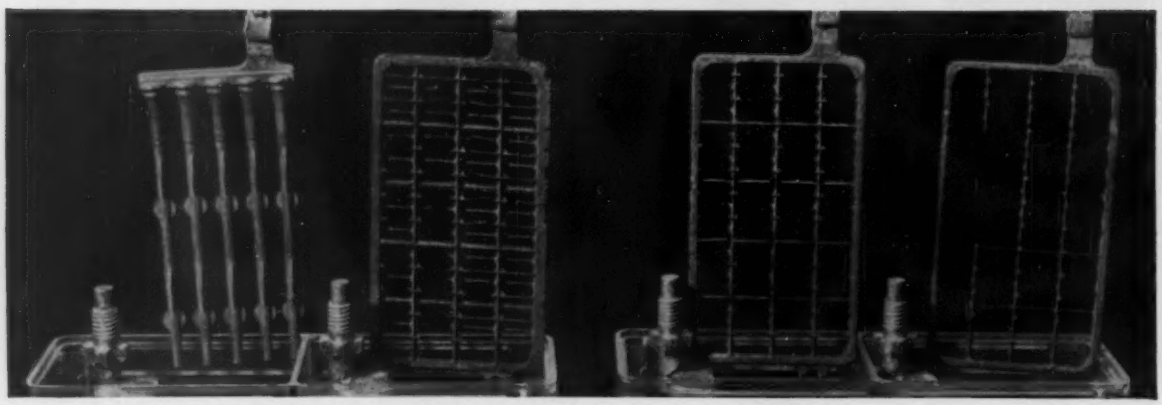
SEE US AT BOOTH # 1204 NATIONAL METAL EXPOSITION & CONGRESS

EXIDE-IRONCLAD BATTERIES

For electric industrial truck operation



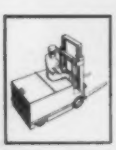
BEFORE: Silvium alloy — Alloy "A" — Alloy "B" — Alloy "C"



AFTER: Note how the Silvium grid resisted corrosion. Compare it with the other alloys.

Corrosion resistant SILVIUM prolongs battery life

BATTERY FOR ELECTRIC INDUSTRIAL TRUCK, Model TH. Fits snugly into space provided on truck. Has tubular construction of positive plates, Silvium grids, "Permanized" negative plates, extra heavy connectors and all other Exide-Ironclad advantages that mean power to spare in heavy duty applications. Write for Bulletin 5161.



Reaching down deep into every Exide-Ironclad Battery are the fingers of Silvium alloy metal which form the grids of the famous Exide-Ironclad positive plates.

Silvium is a special alloy developed by Exide to resist corrosion and thus prolong battery life. For proof, Exide research engineers compared the performance of an Ironclad Silvium grid side by side with ordinary grids of other lead alloys. As the photographs above show, only Silvium came through the test without damaging corrosion—undiminished in size, unimpaired in strength. The other grids showed from moderate to severe corrosion.

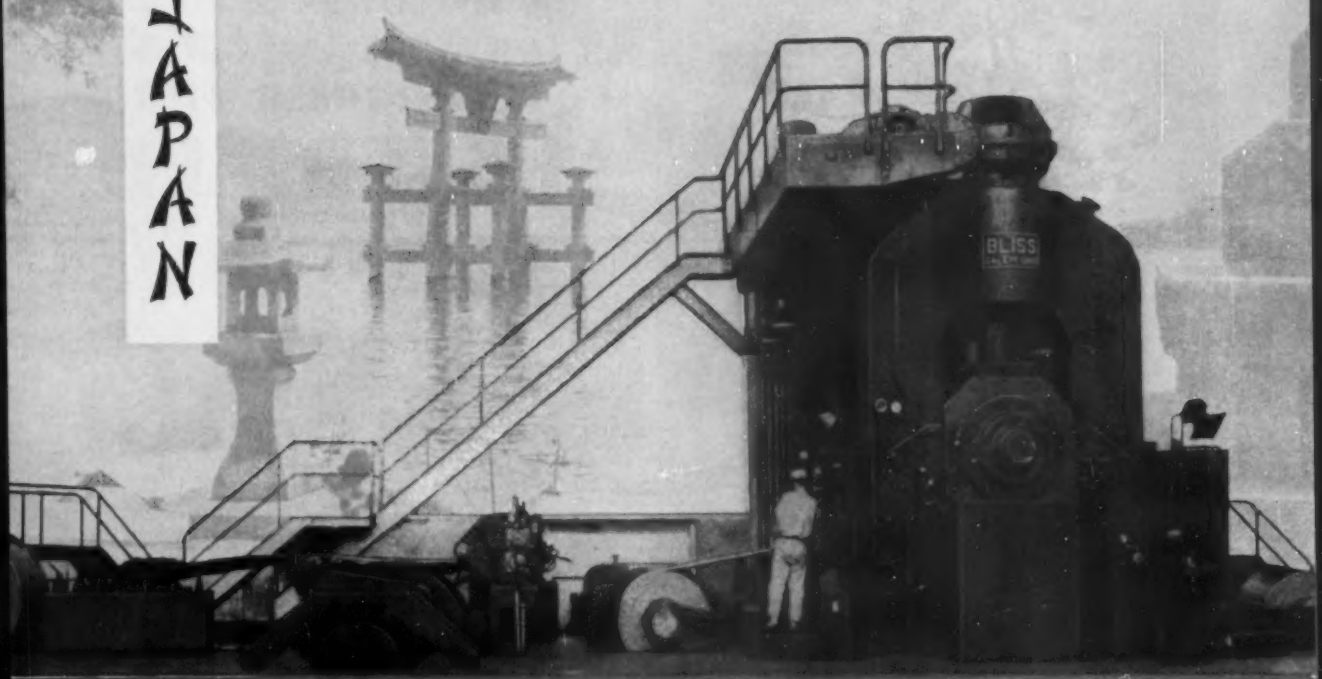
Tests have proved that Silvium is not only more resistant to corrosion, but also a better conductor of electricity. Hence it both prolongs battery life and —because there's less internal battery resistance—more readily permits heavy drafts of power.

This special material is only one of the many exclusive features which have made Exide-Ironclad Batteries world famous for high capacity and long life. When you order batteries for heavy duty applications, or the equipment requiring such batteries, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Phila. 2, Pa.

Exide®

IN JAPAN

NEW Bliss reversing mill doubles in sheet steel and tin plate



This new four-high reversing mill at Yodogawa Steel Works is another example of how Bliss can engineer equipment to meet a special operating need. This ability...and the policy from which it stems... are important reasons why Bliss has grown to be a leading builder of rolling mills and mill equipment in little more than a quarter of a century.

Dual roll coolant systems make it possible for Yodogawa to roll either steel sheet or tin plate. The two systems provide a quick, easy change-over from the water soluble oil solution needed for sheet products to palm oil for tin plate products.

The mill itself is a 16″ and 53″ by 54″ capable of rolling strip up to 48″ in width at a maximum speed of 2012 feet per minute. The tension reels of its coil handling equipment can accommodate 20″ I.D. by 56″ O.D. coils weighing 30,000 pounds. The work rolls are alloy forged steel, while the backing rolls are Technalloy steel cast by Bliss' Mackintosh-Hemphill Division.

To gain an idea of what Bliss can do to help solve your particular rolling problem, write us today for a free copy of our 60-page Rolling Mill Brochure, Catalog 40-A.

E. W. BLISS COMPANY
General Office: Canton, Ohio
ROLLING MILL DIVISION
SALEM, OHIO

PLANTS: Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; Pittsburgh and Midland, Pennsylvania; San Jose, California. *In Europe:* E. W. Bliss (England) Ltd., Derby; E. W. Bliss Co. (Paris), France.

BLISS
SINCE 1857

is more than a name... it's a guarantee

if you make or use parts like these—

WHY NOT SAVE 50% OR MORE AND GET A BETTER FINISH WITH

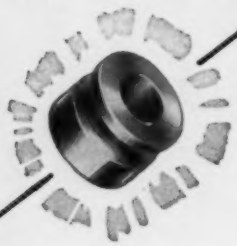
LUSTERIZED*

TRADE-MARK REGISTERED

FINISH

LEDLOY*

COLD DRAWN BARS



LEDLOY "A" leaded bar steels give you double the machining rates of C-1117 or similar steels—and 45% to 60% faster than B-1113.

LUSTERIZED FINISH adds a new ingredient of quality to Bliss & Laughlin Cold Drawn Bars which carries through to improve your fabricated parts.

LUSTERIZED LEDLOY . . . a winning combination for making better products at lower costs.

*Registered Trade-Mark Inland Steel Company.

* LUSTERIZED FINISH, Patent Applied For

BLISS & LAUGHLIN, INC.

GENERAL OFFICES: HARVEY, ILLINOIS

SALES OFFICES IN ALL PRINCIPAL CITIES

FOUR PLANTS:—

HARVEY, ILL.

DETROIT, MICH.

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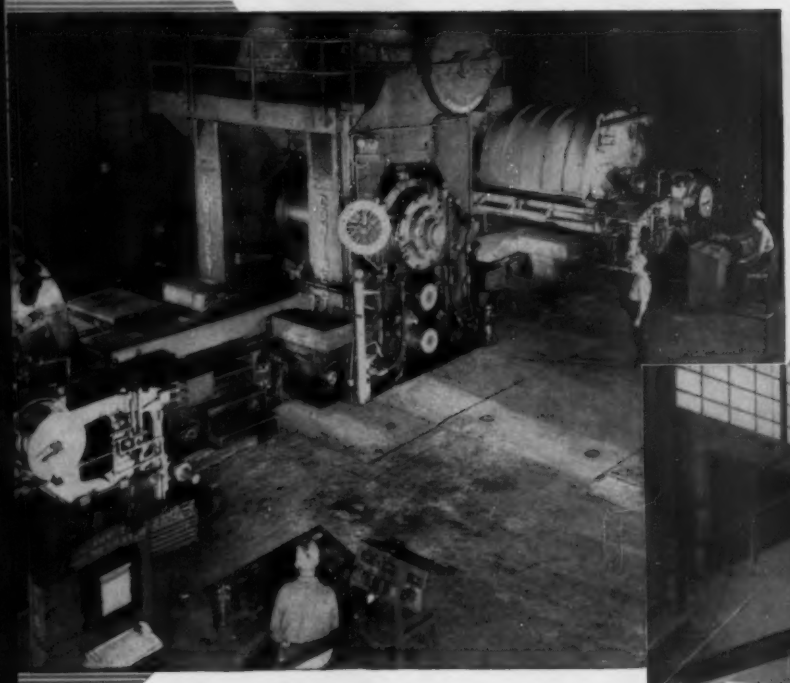
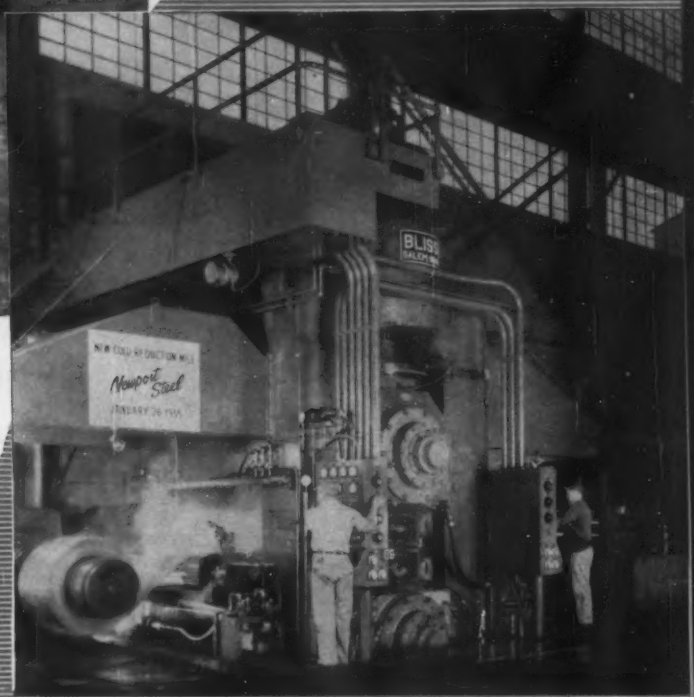
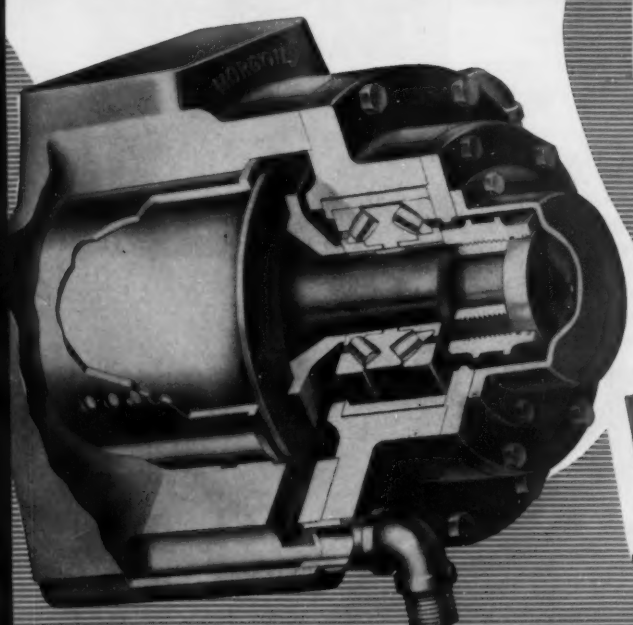
REVERSING MILLS

HOT or COLD





Give Top Performance with MORGOILS



The recent modernization at NEWPORT STEEL CORPORATION, Newport, Kentucky, features a four-high reversing hot mill with Steckel-type furnaces and a four-high cold reduction mill. BOTH mills are equipped with MORGOIL bearings for maximum efficiency.

MB-29

MORGAN
WORCESTER

ROLLING MILLS · MORGOIL BEARINGS
GAS PRODUCERS · WIRE MILLS · EJECTORS
REGENERATIVE FURNACE CONTROL

MORGAN CONSTRUCTION COMPANY
Worcester, Massachusetts
English Representative
International Construction Co., 56 Kingsway, London W. C. 2, England

Our challenge stands

...anything that can be made of steel sheets can be made of

Now we are not suggesting you fabricate a violin out of Wheeling SOFTITE. But it is reassuring to know that *if you wanted to,* here is one sheet that can take every bend, every fold, every intricate turn without peeling or flaking.

Incredible? Amazing? That's Wheeling SOFTITE... the tightest coated sheet yet produced. So tight-coated, in fact, you can use it to make *anything* you can make out of steel sheets.

Yes, SOFTITE, made by the same company that developed Cop-R-Loy, the original copper-bearing steel pipe...and DUCTILLITE, the original cold reduced tin plate. Now SOFTITE, the ultimate in ductile, tight-coated galvanized steel, a product of Wheeling Steel Corporation, Wheeling, West Virginia.

WHEELING

SOFTITE®

GALVANIZED SHEETS

IT'S WHEELING STEEL

District Sales Offices: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Houston, New York, Philadelphia, St. Louis, San Francisco, Wheeling.

Expert Salem-Brosius Engineering
SOLVED
This Tough Heat-Treating Problem

The complex battery of pit-type heat-treating furnaces shown above, drawn to scale and cut away to show the heating action, was designed and erected by Salem-Brosius. They are radiant-tube, gas-fired, forced-circulation furnaces designed to anneal and normalize helicopter propeller tubes and other tubular section in a nitrogen atmosphere.

The first two furnaces in the battery anneal at 1350°F both round and elliptical alloy steel tubes at the rate of 1200 lb per hr. The third furnace has an equal capacity, but normalizes the tubes at 1850°F. These furnaces will handle lengths from 3 to 15 ft and diameters from 6 to 18 in., with either uniform or varying wall thicknesses. Elliptical tubes may range up to 22 in. on the major axis by 10 in. on the minor axis. The equipment seen in the background includes a nitrogen gas generator and gas scrubbing, refrigerating and drying units.

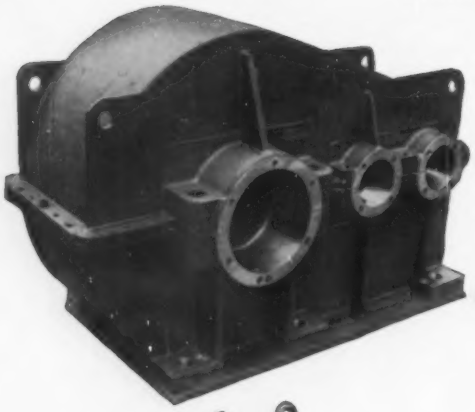
We think you'll agree that in successfully solving this heat-treating problem, Salem-Brosius has the experience and know-how to solve yours. Write to us.

SALEM-BROSIUS, INC.

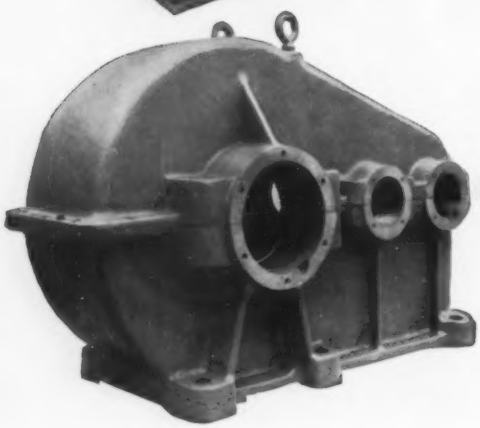
CARNEGIE, PENNSYLVANIA

IN CANADA: SALEM ENGINEERING LTD. · 1525 BLOOR STREET WEST, TORONTO 9, ONTARIO

Case History No. 32 • SPEED REDUCER HOUSING



69 FABRICATED PARTS



2 GRAY IRON CASTINGS

***Plus* . . . 73% saving on cost of unmachined pieces.**

***Plus* . . . 20% saving on machining cost.**

The performance of the Gray Iron casting is superior to the assembly, because of Gray Iron's ability to absorb vibration. Furthermore, this characteristic provides the added dividend of quieter operation. Savings on the first three units made up the difference between pattern costs and template costs.

Look at the two housings. Consider appearance plus savings. Can there be any question about which is the better buy!

Somewhere in your plant, there must be a place where use of Gray Iron will save you money and improve your product.

For specific technical and business information, write direct to Gray Iron Founders' Society, Inc., National City—East 6th Building, Cleveland 14, Ohio.

This symbol assures you the most for your casting dollar

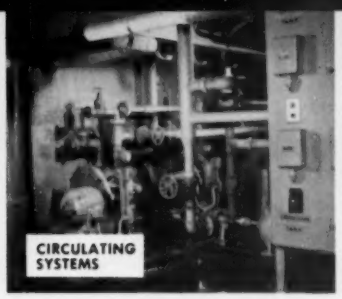
Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

MAKE IT BETTER WITH GRAY IRON

GRAY IRON FOUNDERS' SOCIETY

IN CANADA: SALEM ENGINEERING LTD. 1525 BLOOR STREET WEST, TORONTO 9, ONTARIO



SUN SOLNUS OILS IDEAL LUBRICANTS FOR 80% OF ALL APPLICATIONS

Moderately priced...low in carbon-forming tendencies, Sun Solnus® oils simplify your storage problems by doing with *one oil* many jobs that would otherwise require *several.* Their ability to protect metal parts against corrosion, their resistance to oxidation, and their moderate price all add up to "more lubrication per dollar."

For technical information, see your Sun representative, or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-51.

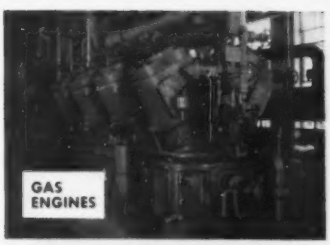
SUNOCO

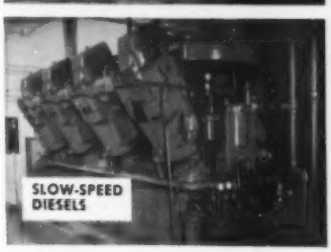
INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA. ® SUN OIL CO.

In Canada: SUN OIL COMPANY LIMITED, Toronto and Montreal





Valve on left is from compressor run for 3,000 hours with well-known, high-grade oil. At right is same valve after a 3,000-hour run with Sun Solnus oil. Note difference in carbon deposits.

3000-HOUR TEST PROVES SUN SOLNUS OILS REDUCE CARBON BUILD-UP IN COMPRESSORS

Equipment: A three-stage Norwalk horizontal-type compressor. Operating pressure: from 1,000 to 1,500 psi.

Test: The compressor was cleaned thoroughly and filled with a well-known, high-grade oil. The equipment was run for 3,000 hours, then torn down for inspection and cleaning. Then Solnus® 300 was tested in the same way.

Results: Look at the two pictures. You can see for yourself how Solnus oil reduced dangerous carbon build-up.

All types of reciprocating air compressors that have been changed over to a Sun Solnus oil show similar results. A test in your compressor will show the same remarkable reduction of carbon deposits.

You can get a technical bulletin about Sun Solnus oils by asking your Sun representative, or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-52.

SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY PHILADELPHIA 3, PA.

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IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

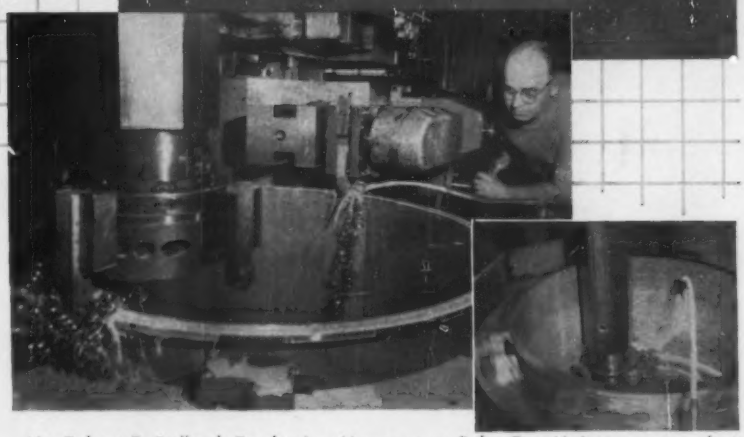
PRODUCTION "at all time Peak"

with BULLARD

MAN-AU-TROL VERTICAL TURRET LATHE

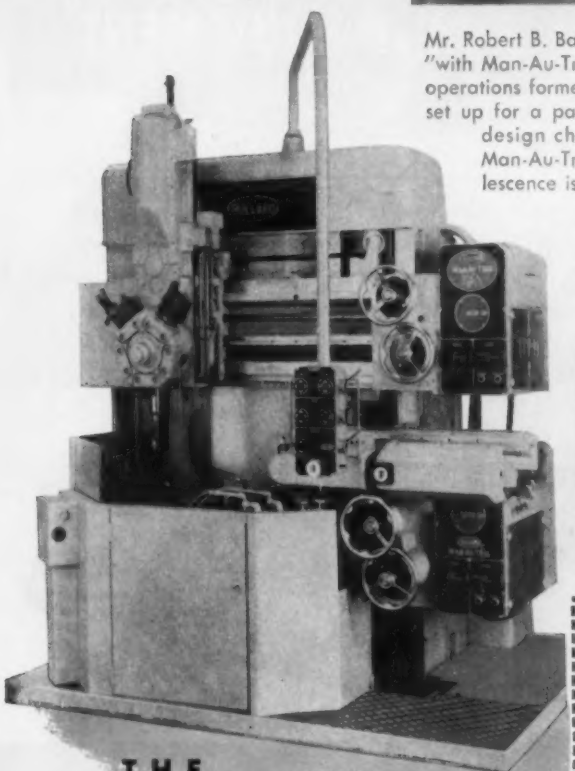
MODEL 75

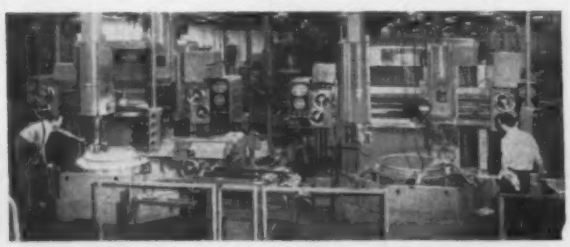
Solar Aircraft Company of Des Moines, Iowa and San Diego, California, has found the versatility and flexibility of the Bullard Man-Au-Trol V.T.L., Model 75 a distinct advantage in the machining and fabricating of various jet aircraft engine parts and assemblies.



Mr. Robert B. Ballard, Production Manager at Solar-Des Moines, reports that "with Man-Au-Trol, Model 75, it is possible to do a multitude of machining operations formerly requiring numerous expensive machines which had to be set up for a particular operation, so limited in scope, that an engineering design change either obsoleted the tooling or the machine. With Man-Au-Trol, Model 75, because of its wide range of functions, this obsolescence is greatly reduced — if there is a design change, only a new set-up is made — not the purchase of a new multi-thousand dollar piece of machinery."

These same advantages can be applied to your manufacturing methods —
Ask your Bullard Sales Engineer for complete details.





THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

THE BULLARD COMPANY
286 CANFIELD AVENUE • BRIDGEPORT 9, CONNECTICUT

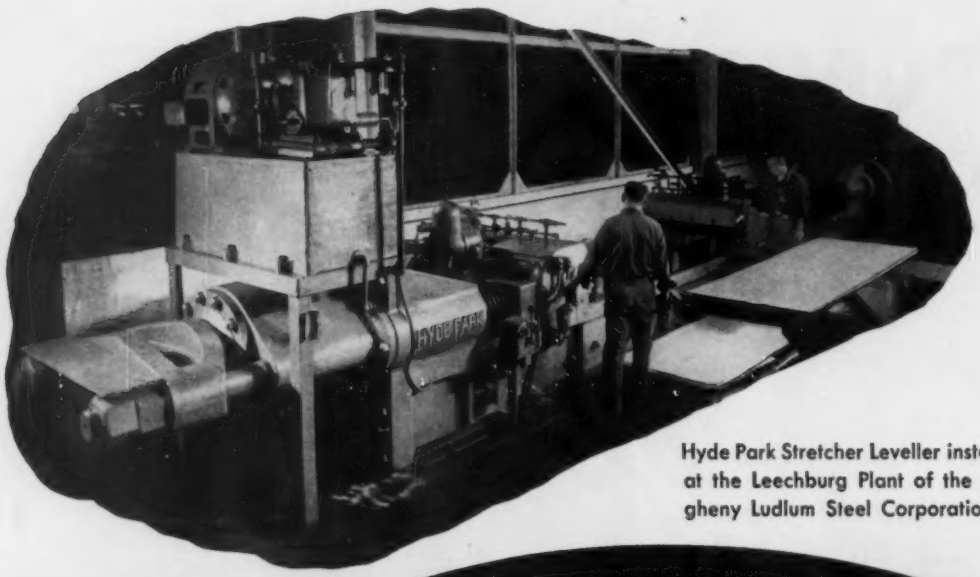
Please send me a copy of the
NEW MAN-AU-TROL V.T.L., MODEL 75 CATALOG

NAME.....

COMPANY..... POSITION.....

ADDRESS.....

CITY..... ZONE..... STATE.....



Hyde Park Stretcher Leveller installed at the Leechburg Plant of the Allegheny Ludlum Steel Corporation.

Hyde Park ROLLS and ROLLING MILL EQUIPMENT

ROLLS

Alloy Iron • Chilled • Sand for Ferrous, Non-Ferrous and Plastic Industries

ROLLING MILL EQUIPMENT

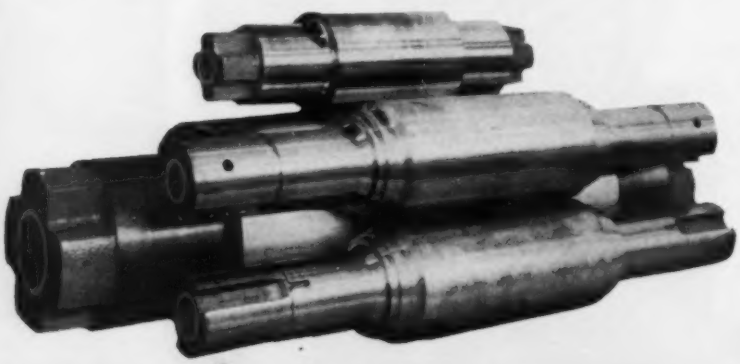
Bar Mills • Stretcher Levellers
Merchant Mills • Guillotine Shears
Sheet & Strip Mills • Sheet Mill Shears
Pinion Stands • Roll Lathes • Roller Tables • Special Machinery • Reduction Drives • Machine Work

GRAY IRON CASTINGS UP TO 80,000 LBS.

Machinery Castings • Mill Housings
Lathe Beds • Shear Plate • Housings
Lay-out Plates • Pinion Housings
Bedplate Plates

RED CIRCLE Rolls ALLOY-CHILLED

In this period of increasing competition when high production costs can so easily disrupt sales, Hyde Park Rolls and Hyde Park Rolling Mill Equipment take on a new order of importance; for Hyde Park means efficiency. Yes, smoother operation, less maintenance cost, more economical production.



Hyde Park FOUNDRY & MACHINE CO.
HYDE PARK, WESTMORELAND COUNTY, PITTSBURGH DISTRICT, PA.

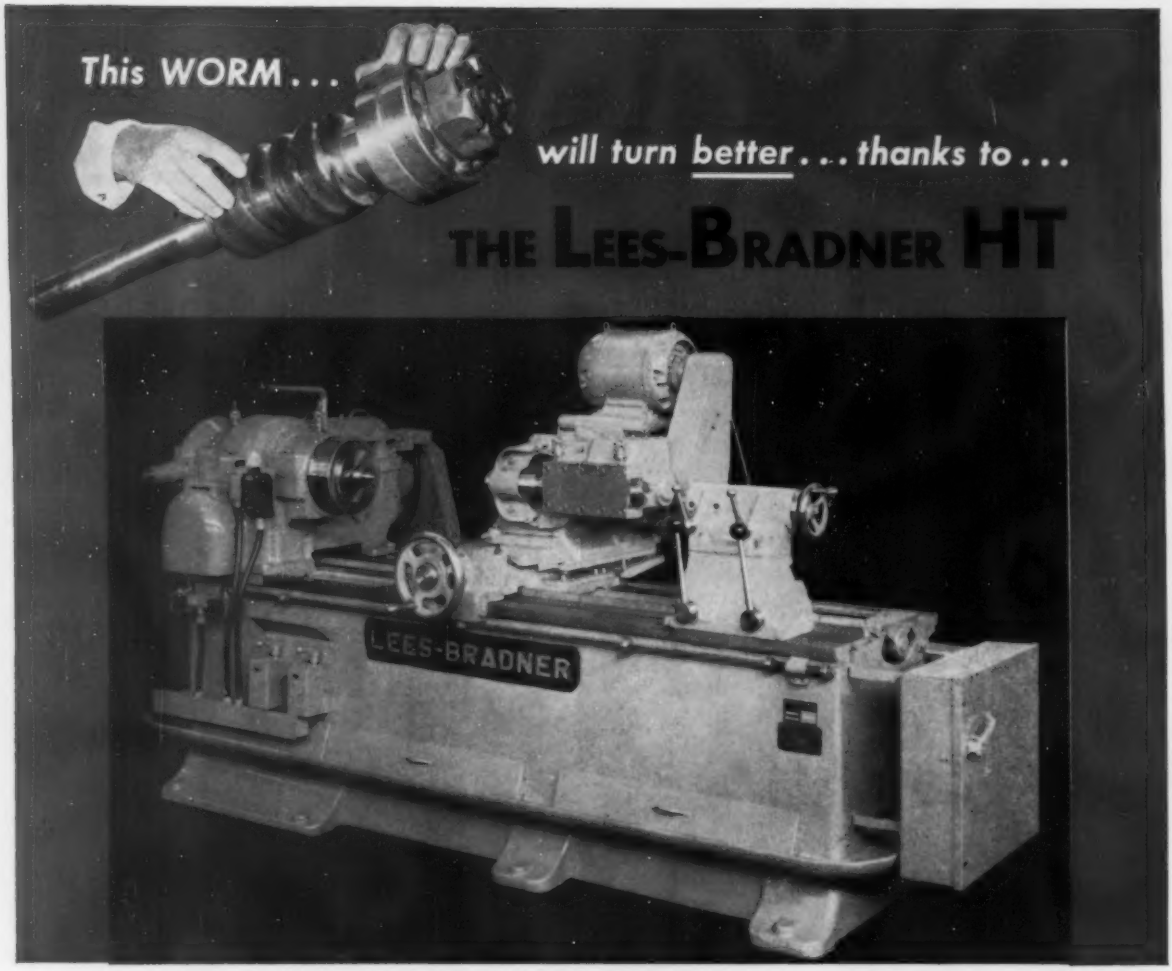
Real tension on this job!

When the man on the right tightens the strap and the man on the left applies the seal—tying the knot, in effect—the strength of steel is on the job. The tension the strap will take and hold, its flatness and its flexibility make an indispensable combination for holding these coils of steel and for holding and reinforcing countless other materials and packages for industry. There's a right size of Signode steel strapping for your needs. There are hand tools and pneumatic tools and even completely automatic tools for applying it at lowest cost. It can make your product cost less to handle, store, ship and receive. See your Signode representative. No obligation. Just write:

SIGNODE STEEL STRAPPING CO.

2623 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-wide.
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto



Building precision into other machine tools is the unique distinction that can be claimed for The Lees-Bradner Model HT Thread Milling Machine.

The worm illustrated above was produced on this machine by the Cleveland Worm and Gear Co. in one hour 23 minutes at a cutter spindle speed of 61 R. P. M. The pitch diameter of the worm was 3.728″ with an outside diameter of 4.625″.

Many tough thread milling problems like this have been, and are being, solved by this remarkably versatile machine.

Contact us or your local Lees-Bradner representative for complete information on fast, precision threading with the Model HT Universal Thread Milling Machine.

Details on Worm Gear Production

Hob Spindle Speed	61 R. P. M.
Circular Pitch	1.420″
Pitch Diameter	3.728″
Outside Diameter	4.625″
Threading Time	1 hour 23 min.
Material	2315 Steel
Weight of Worm	51.76 lbs.

the LEES-BRADNER Company

CLEVELAND 11, OHIO, U.S.A.

From Small Fasteners, Mighty Products Grow

Fasteners are a small but exceedingly important component of most assembled products. So important, in fact, that they make dreams become reality and ideas tangible.

For 90 years, Lamson-manufactured bolts, nuts and screws have played a major role on the drawing boards and the assembly lines of industry. Constant research and progressive engineering have kept Lamson fasteners abreast of the growing demand for "better ways to put products together".

Behind every bolt, nut and screw is a dependable "Statistical Quality Control" inspection system. This assurance of quality keeps assembly lines running and saves you time, money and trouble.

These are only a few of the many reasons why your product will be a *better* product if it's fastened by Lamson & Sessions!

The LAMSON & SESSIONS Co.

1971 West 85th Street · Cleveland 2, Ohio

PLANTS AT CLEVELAND AND KENT, OHIO · BIRMINGHAM · CHICAGO

PRODUCTION MACHINERY

GREENLEE

Simplified

CROSS-SLIDE CAMMING

ON GREENLEE BAR AUTOMATICS

Gives You Greater Flexibility... Saves Setup Time

CAMS ARE INTERCHANGEABLE

CAMS ARE SMALL, EASY TO HANDLE

CAMS HAVE UNIFORM HIGH-POINT

Greenlee simplified camming results in simplified, fast setups. Operation is economical and efficient . . . especially so on short runs. Each cross slide operates independently by a separate cam . . . long operations are easily split up for greater flexibility and more effective use of machining time. On a Greenlee your investment in cams is held at a minimum . . . the same cams can be used on any cross slide. Greenlee engineers will be glad to show you how to reduce profit-stealing setup time on the simplified Greenlee. Take advantage of this valuable service now.

Do you receive a copy of the Greenlee "Automatic News" regularly? If not, write and ask to be placed on our mailing list. Give company name and job responsibility.

WRITE TODAY FOR CATALOG A-405

PRODUCTION MACHINERY

GREENLEE

GREENLEE BROS. & CO.
1809 Mason Avenue
Rockford, Illinois

MEMORANDUM

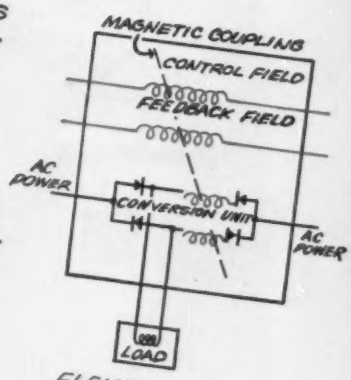
FROM: THE CLARK CONTROLLER CO. TO: OUR CUSTOMERS

SUBJECT: MAGNETIC AMPLIFIERS m/a

HERE ARE THE SIMPLE FACTS ABOUT OUR MAGNETIC AMPLIFIERS:

USED PRIMARILY AS INDUSTRIAL DRIVE REGULATORS ON CONTROL SYSTEMS, THEY CONSIST BASICALLY OF THREE MAGNETICALLY-COUPLED ELEMENTS:

1. A CONTROL FIELD –
2. A FEEDBACK FIELD –
3. A CONVERSION UNIT –

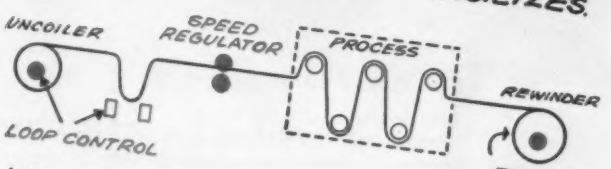


ELEMENTARY MAGNETIC AMPLIFIER

IF CONTROL FIELD AMPERE TURNS EXCEED FEEDBACK FIELD AMPERE TURNS IN A POSITIVE DIRECTION, OUTPUT IS TURNED ON. IF THE REVERSE OCCURS, OUTPUT IS TURNED OFF.

HERE'S HOW THIS IS APPLIED: IN A GENERATOR VOLTAGE REGULATOR, FOR EXAMPLE, THE CONTROL FIELD IS CONNECTED TO A REFERENCE SOURCE OF VOLTAGE, THE FEEDBACK FIELD TO THE ARMATURE TERMINALS, AND THE SHUNT FIELD TO THE LOAD TERMINALS. INCREASING AMPERE TURNS IN THE CONTROL FIELD TURNS ON THE REGULATOR, RAISING GENERATOR VOLTAGE UNTIL FEEDBACK BALANCES CONTROL FIELD, AT WHICH POINT THE SYSTEM STABILIZES.

AMONG THE MANY REGULATING SYSTEMS USING THIS PRINCIPLE ARE: CONSTANT TENSION COIL WINDING, SPEED REGULATION, POSITION REGULATION (LOOP CONTROL, EDGE CONTROL, SYNCHRONIZING CONVEYORS, ETC.).



MECHANICAL SCHEME FOR CONTINUOUS WEB OR STRIP PROCESSING CONTROL

THE MAGNETIC AMPLIFIER HAS ALMOST LIMITLESS APPLICATION AS A "SERVO" DEVICE TO MAINTAIN A PRE-DETERMINED RELATIONSHIP BETWEEN TWO FACTORS AS IN HEAT CONTROL, WEIGHT OR VOLUME CONTROL, PRESSURE CONTROL, TRANSDUCERS, METERING, CONTINUOUS PLATING CONTROL, ETC.

AS YOU CAN SEE FROM THE ABOVE, CLARK MAGNETIC AMPLIFIERS ARE IDEAL FOR USE IN AUTOMATION SYSTEMS. THEY ARE STATIC DEVICES WITHOUT TUBES, THUS REQUIRING NO WARM-UP TIME AND PRACTICALLY NO MAINTENANCE. THEY ARE FACTORY ADJUSTED, SIMPLIFYING INSTALLATION.

Clark's wide experience in applying magnetic amplifiers to industrial drives is at your service.

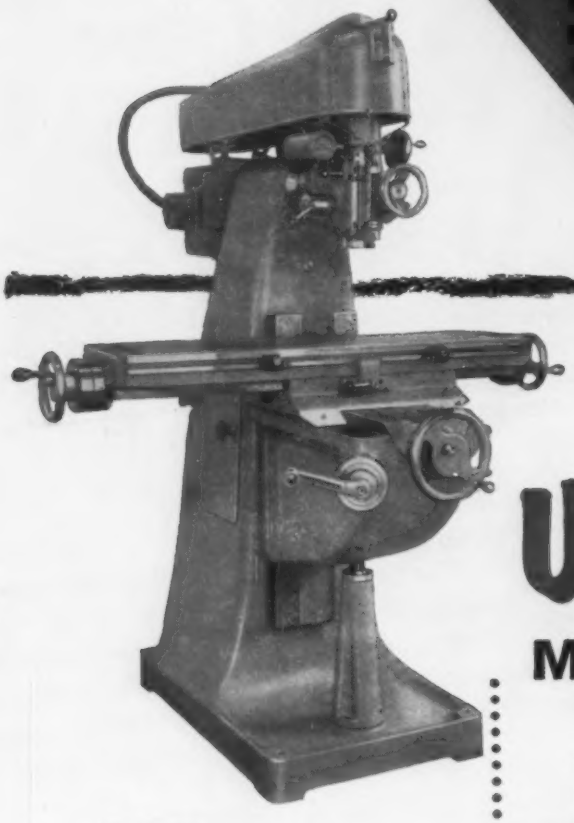
The CLARK CONTROLLER Company

Engineered Electrical Control

1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

Choice of hand or
power feed head and table



BALANCED RIGIDITY

assures
*CERTIFIED
ACCURACY

in the NEW

U.S. Vertical
MILLING MACHINE

Balanced rigidity, the key to accuracy for vertical and angular milling operations, is an integral part of the new U. S. Vertical Milling Machine.

These U. S. Vertical features provide rigidity for close tolerance work:

- Machine weighs 2000 pounds
- Extra wide bearing surfaces
- Motor mounted behind column, balances weight of head, resists vibration and deflection
- Major castings are internally ribbed, normalized, stress relieved, and internally braced
- Dovetails are deep and hand scraped
- Massive knee, saddle and table

Drive by B section V belt

***Tested 10 Ways!**

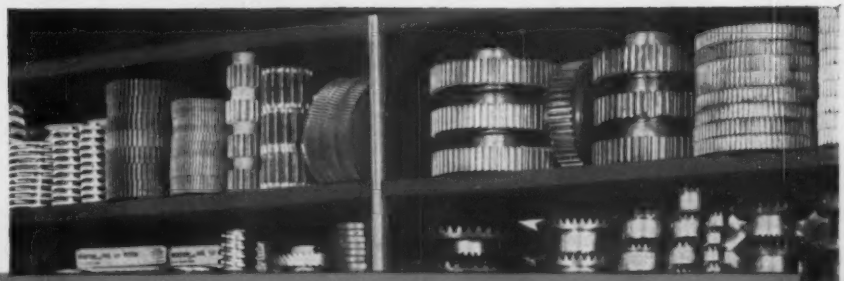
The accuracy of each U. S. Vertical Milling Machine is certified. A check sheet accompanies every machine listing 10 exacting operational tests the machine has passed. The check shows allowable tolerances and actual measured tolerances of the individual unit. A new bulletin provides complete specifications and illustrates various accessories available on the new U. S. Vertical Milling Machine. Write for your *FREE* copy today.

U·S·Burke
MACHINE TOOL DIVISION

32 Brotherton Road
Cincinnati 27, Ohio

Manufacturers of:
Burke Bench Mills, U. S. No. 1 Milling Machine and the radically new U. S. Quartet

When you plan for COST REDUCTION —use this time-proved FORMULA

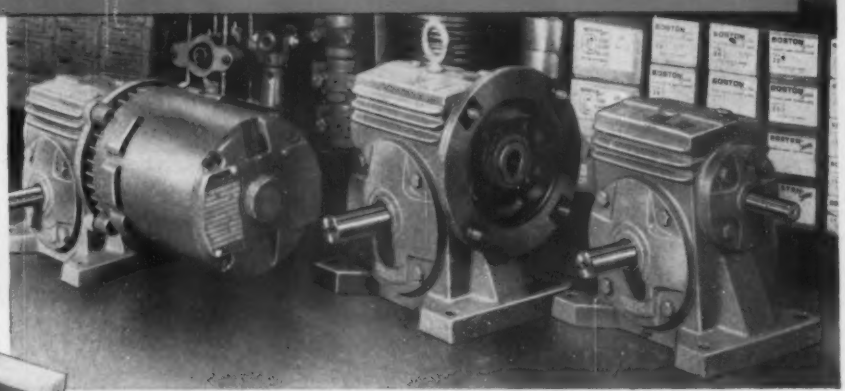


Selection from the **BOSTON Gear CATALOG** + Ordering from your local **BOSTON Gear DISTRIBUTOR** = Trouble-free . . . cost-wise **TRANSMISSION** design and maintenance **ECONOMY**

All the parts you need from the complete line of 7124 STANDARDIZED PRODUCTS

anywhere in U. S. or Canada for prompt delivery OFF-THE-SHELF- AT FACTORY PRICES

- You simplify planning
- You save time and expense
- You get recognized top-rating in quality and performance



Get the NEW Catalog No. 56

576 PAGES — lists all products

You'll find hundreds of new products, new models, new sizes — and 50 pages of simplified Engineering Data to help you plan new efficiency, new economy in any transmission hookup. Boston Gear Works, 72 Hayward Street, Quincy 71, Massachusetts.

CALL YOUR

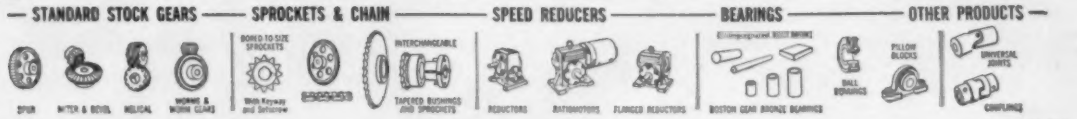
BOSTON® Gear DISTRIBUTOR

For nearest Distributor, look under "GEARS" in the Yellow Pages of your Telephone Book.

BOSTON Gear is right here!

7124 "OFF-THE-SHELF" TRANSMISSION PRODUCTS FROM STOCK - AT FACTORY PRICES ASK FOR CATALOG

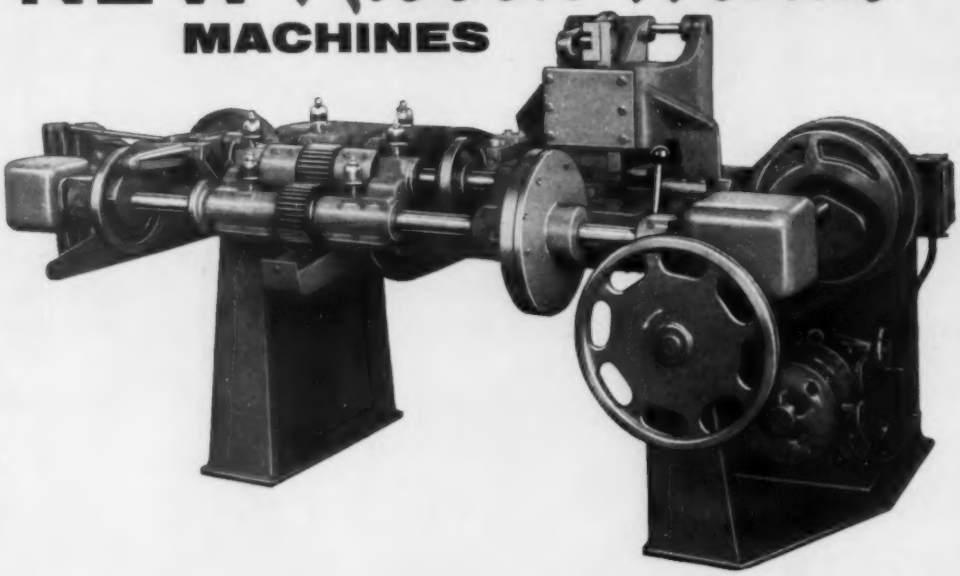
— STANDARD STOCK GEARS — SPROCKETS & CHAIN — SPEED REDUCERS — BEARINGS — OTHER PRODUCTS —



56BG-NC-25A

...ask BAIRD about it

NEW *Ribbon Metal* MACHINES



Open UNEXPLORED opportunities for cost reduction in manufacture of a wide range of parts.

- HIGH SPEED
- UNIFORM PRODUCT
- LOW TOOLING COST
- EASY MAINTENANCE
- SIMPLE OPERATION
- UNLIMITED RANGE

If you are producing small . . . or even quite large . . . formed parts out of ribbon wire or metal strip up to about 2" wide, it will most certainly pay you to "ask Baird about it." More and more quality and cost-conscious manufacturers are finding that our NEW model Automatic High Speed Ribbon Metal Forming Machines are the ideal "production line" for such products.

Behind these machines are years of successful application to a range of work "limited only by the ingenuity of the men who design the tooling." NEW models include a host of important improvements and additional features which greatly extend the range of work and tooling possibilities. For example, what is essentially a substantial press is built right into the machine and is capable of maintaining precision in high-speed production. Baird's unique two-to-one feeding mechanism and EASY cam motions, combined with the fact that 3/4 of the cycle is available for forming rather than the usual 1/2-cycle, permits far greater latitude in combining operations and complexity of possible forms.

Our Engineering Department will be glad to give you further detailed information or to submit recommendations on parts or prints of your product. Write Dept. IA.

Interested in Deferred Payment? . . . "ask Baird about it."

THE BAIRD MACHINE COMPANY
STRATFORD CONNECTICUT

7BA56

HOW DID THIS PLANT CUT SHIELDING GAS COSTS *80%?*

With MAGS . . . Liquid Carbonic's new all CO_2 method of metal-arc gas shielded welding. In the new MAGS process, low-cost CO_2 (1½c or less per cu. ft.) is the *only* shielding gas. Expensive argon or helium are eliminated . . . a saving of up to $7.00 per hundred feet of shielding gas!

MAGS gives you both quality and speed...equal or superior to welds made with straight argon or helium shielding.

MAGS starts you saving NOW. Your present equipment—hand or automatic—can probably be used, either "as is" or with modifications.

A special welding grade CO_2 is available. Developed by Liquid Carbonic specifically for metal-arc-gas shielded welding, this extremely pure gas assures MAGS welds of the highest quality.

For complete technical and operating data

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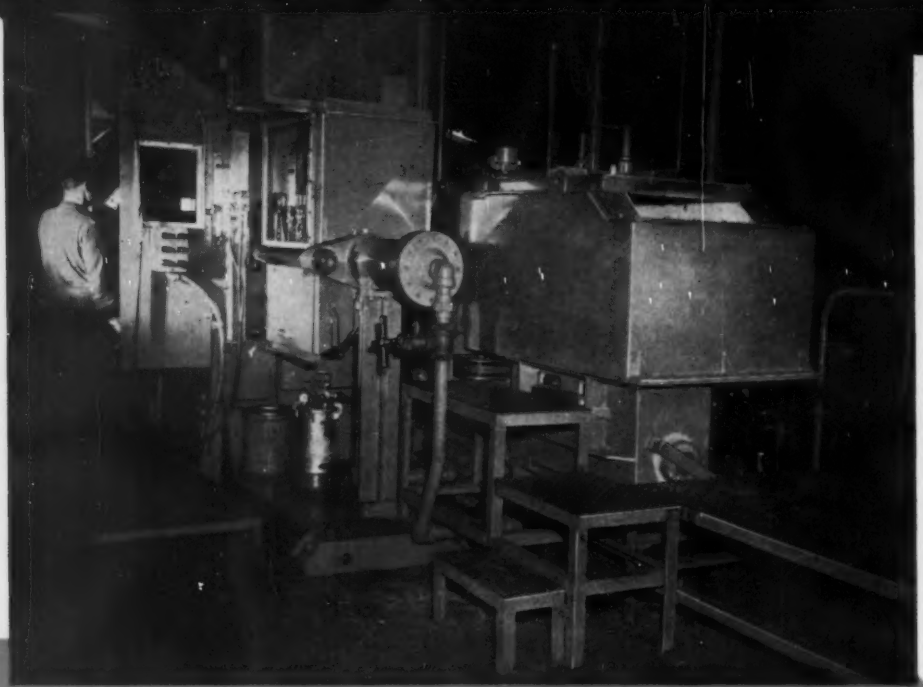
ALUMINUM MELTING AND DIE CASTING INTEGRATED....



with the duplex AJAXOMATIC®

With the touch of a button the operator releases the complete automatic cycle: die closing, Ajaxomatic pour, shot, cooling, die opening, ejection.

Simultaneously, the Duplex *Ajaxomatic* melts batches of scrap and pig. Weight, time and temperature of each automatic pour are closely controlled.

RESULTS: Higher production rate. Uniform casting quality. No molten metal handling. No operator fatigue.

PRODUCTION: Up to 500 pounds per hour.

CASTING SIZE: 1/2 pound to 20 pounds.
(Special units available for higher ratings)

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Oct. 8-12

MAY WE STUDY YOUR REQUIREMENTS?

AJAX ENGINEERING CORP., TRENTON 7, N. J.

AJAX INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting

® Reg. U. S. Patent Office

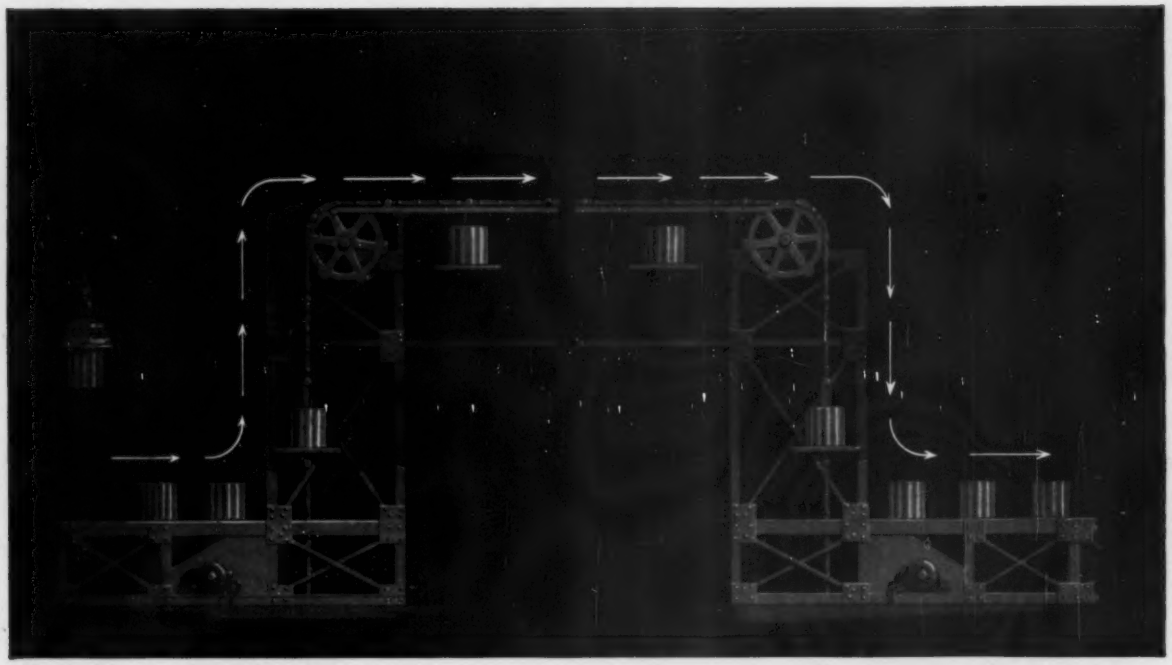


Diagram of the JEFFREY continuous automatic ingot conveyor system at Standard Steel Works Division, Baldwin-Lima-Hamilton Corporation, Burnham, Pennsylvania.

75% saving in handling

Ingots start their trip to the rolling mill here. No more delays for batch-loading onto flat cars.

credited to this JEFFREY Conveyor System

Rising vertically for 20 feet, leveling off to a 25° incline across railroad tracks and a road, horizontally for another 57 feet, then descending to the receiving station—that's the aerial route taken by this JEFFREY conveyor. Transfer time, 3¼ minutes. Distance traveled, 168 feet, compared to a mile when railroad cars were used for this task.

Little labor is required, since a spring-mounted gravity roller conveyor automatically feeds the one-ton ingots to the chain gathering conveyor. The tray conveyor picks them up there and carries them to the rolling mill, where they travel past the weighing station on chain conveyors to the unloading point.

There's considerable saving, too, on badly needed storage space. Ingots move away at a rate of four per minute, so they don't pile up in the open hearth shop.

Write for catalogs containing complete information on JEFFREY handling equipment. The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT • TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

New spindle design for Farrel® HD grinder! Result: *finer accuracy, reduced maintenance*

A number of improvements have recently been made in the Farrel heavy duty roll grinder and important among these is the new grinding wheel spindle design.

Of large diameter for its length—to assure rigidity under working load—the spindle is mounted in Farrel "Truaxial" bearings. These offer many benefits over previous designs for smooth, vibrationless operation, faster and better finishing, ease of adjustment, positive lubrication and economy of maintenance.

Split, self-aligning pillow blocks provide positive positioning of the spindle in its bearings. Adjustment of running clearance is accomplished through adjusting screws. Contracting pressure of the pillow block on the supporting points of the bearing creates the effect of five individual bearing shoes, with a self-energized, high-pressure wedge of oil entering each of the five bearing areas. A fresh supply of oil is introduced between each of the bearing areas under predetermined pressure to assure an adequate, unbroken film over the entire bearing surface.

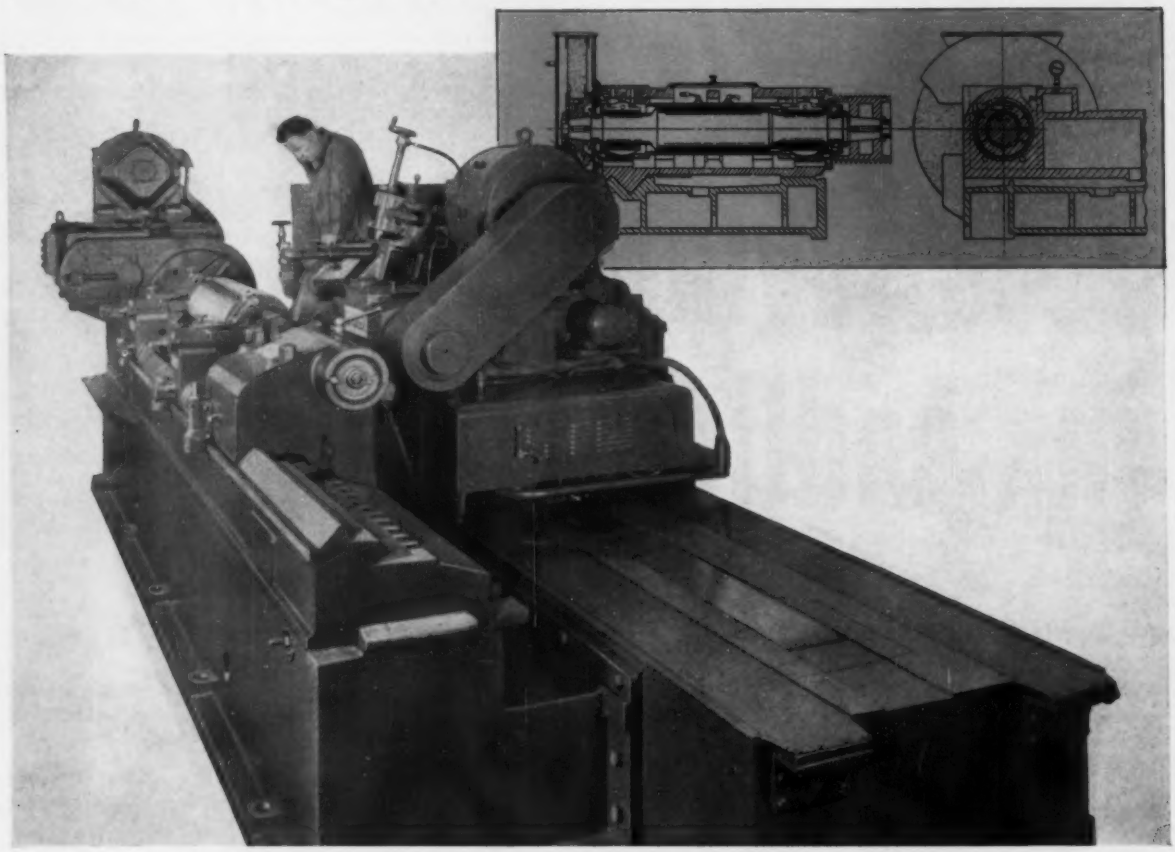
Spindle end thrust is taken by hardened steel thrust collars at the pulley end of the spindle. Grinding wheels and drive pulleys are end-mounted, permitting change of wheels and V-belts without disturbing either spindles or bearings.

Write for full details of this and other features of the improved Farrel HD roll grinder.

●

FARREL-BIRMINGHAM CO., INC.
ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y. *Sales Offices:* Ansonia, Buffalo, Akron, Chicago, Fayetteville (N. C.), Los Angeles, Houston



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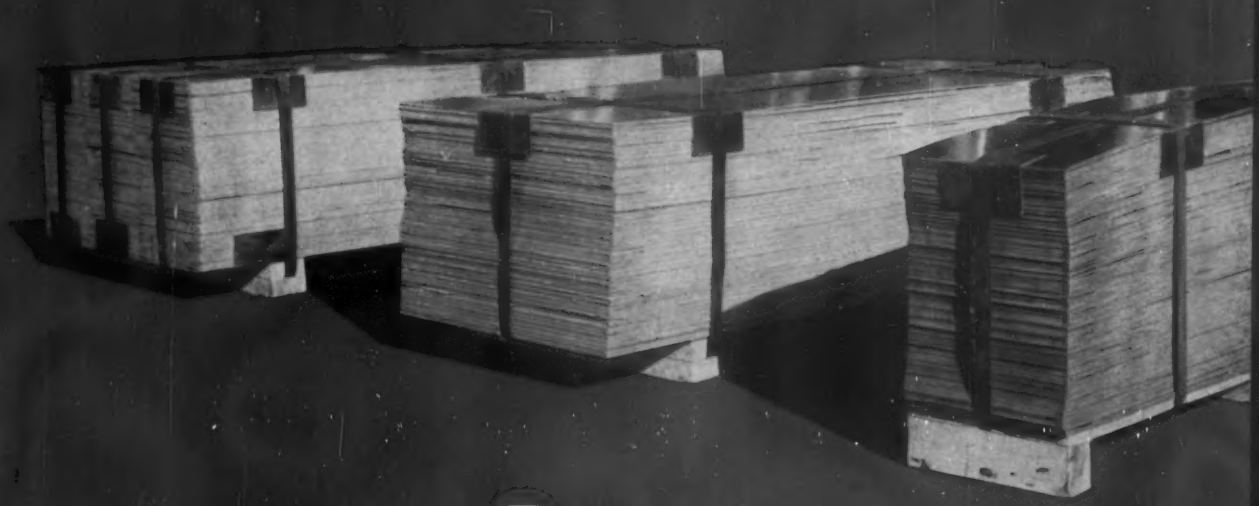
Farrel-Birmingham®

FB-1076



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Ingersoll
STEEL DIVISION

BORG-WARNER CORPORATION, NEW CASTLE, INDIANA

*BORG-WARNER TRADE MARK

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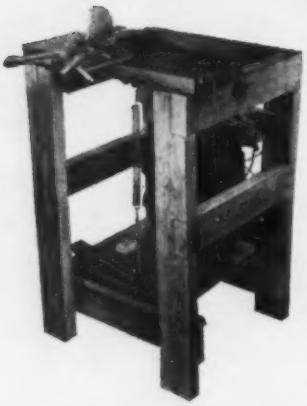

beginning . . .

First experimental multi-spot welder model developed in 1901 for welding fan blades to hubs.

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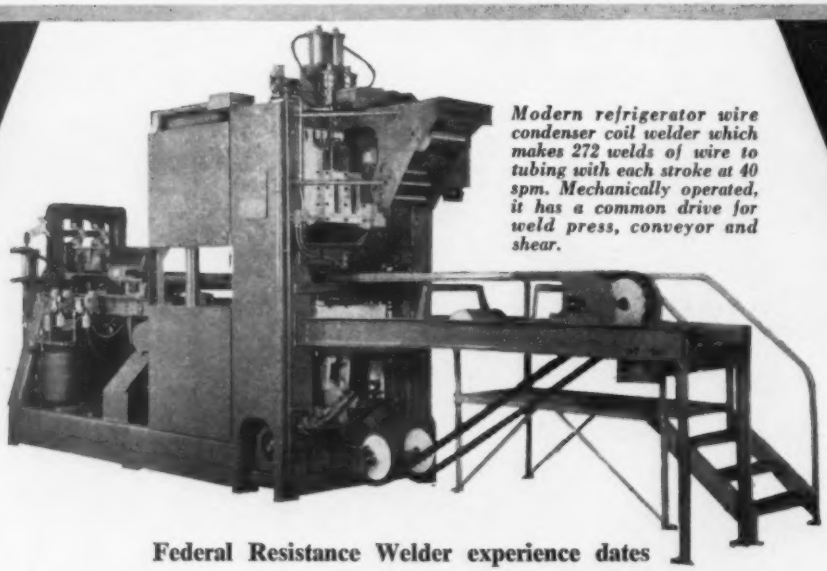
has always been
FIRST IN RESISTANCE WELDING



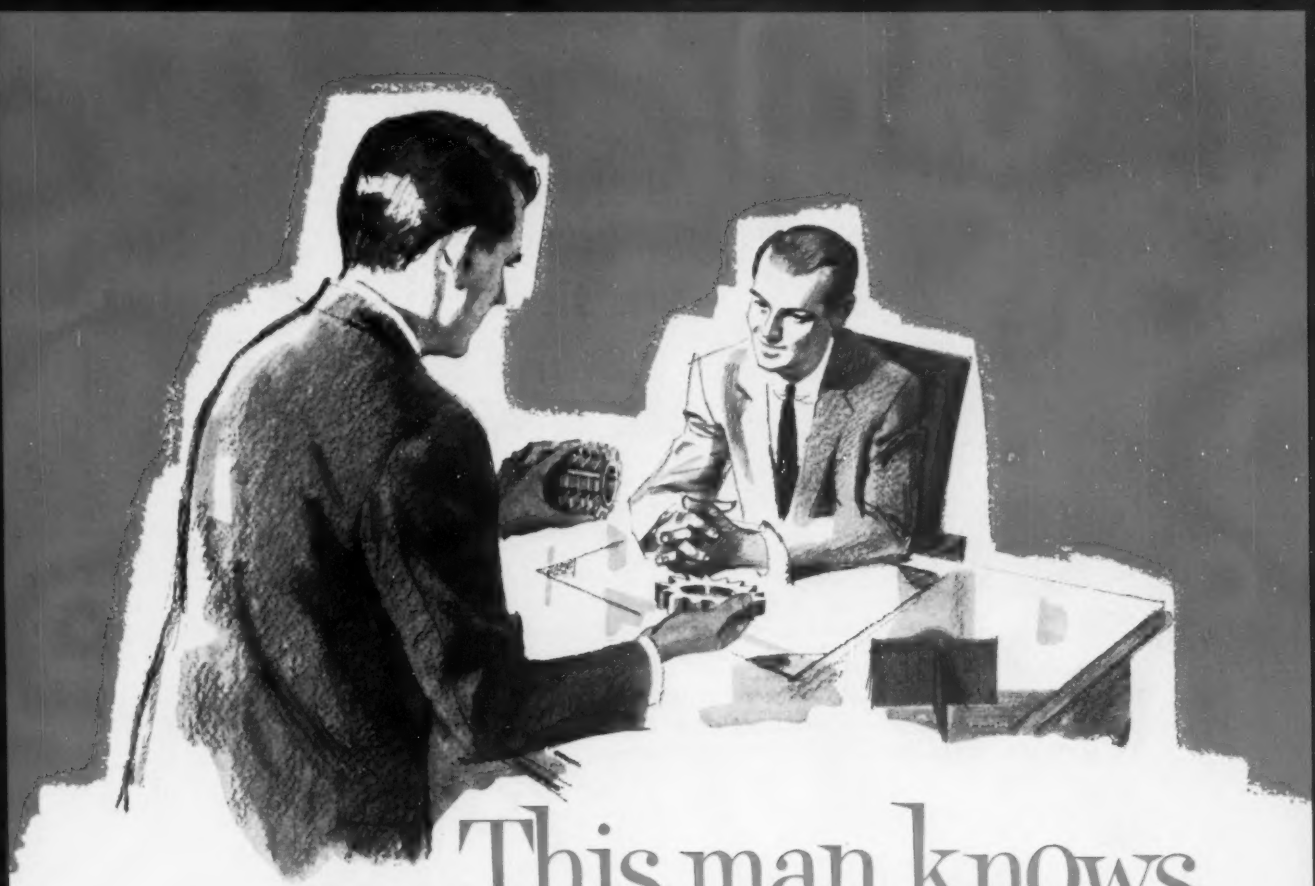
Modern refrigerator wire condenser coil welder which makes 272 welds of wire to tubing with each stroke at 40 spm. Mechanically operated, it has a common drive for weld press, conveyor and shear.

Federal Resistance Welder experience dates back to the very beginning of resistance welding. From that day to this, Federal has remained "First in Resistance Welding" engineering, design and development.

5

Federal WELDERS · Warco PRESSES

THE FEDERAL MACHINE AND WELDER COMPANY
WARREN, OHIO



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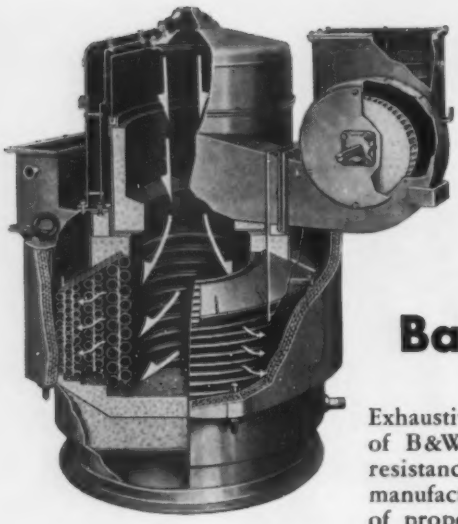

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Standardize on Babcock & Wilcox ERW Tubing

Exhaustive tests by Vapor engineers have proved the advantages to railroads of B&W ERW tubing—for unvarying uniform thickness, corrosion-resistance and long, trouble-free tube life. B&W welded tubing is precision manufactured from selected, scale-free strip steel of uniform thickness and of proper A.S.M.E. designated specifications. That's why B&W ERW tubing is standard with Vapor—for its full line of Steam Generators, for both new and replacement use.

SELECTED BY VAPOR HEATING CORPORATION, WORLD'S LARGEST PRODUCER OF COIL TYPE PACKAGE STEAM GENERATORS, BECAUSE IT'S MANUFACTURED WITH PRECISION—TESTED FOR UNIFORMITY

tested 8 WAYS for performance in service

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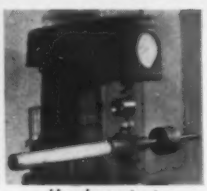
Chemical checks

Tensile test



Hardness test

Frequent periodic testing and inspection of every tube assures consistent high quality and uniformity. Each B&W Electric Resistance-Welded Pressure Tube is subjected to the hydrostatic test. Hardness and chemical tests are made to specifications. Flanging, flattening and reverse flattening tests assure weld quality control. Micrometric inspection provides positive uniformity of outside diameter and wall thickness. That's why B&W ERW tubing has achieved acceptance for so many diversified pressure applications, including approval under U. S. Navy Specification MIL 17188. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

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Flattening test

Crush test Flange test

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Seamless and welded tubular products, seamless welding fittings and flanges—in carbon, alloy and stainless steels

always SOMETHING NEW in making butt weld pipe...

● Seldom will you see two butt weld pipe mills exactly alike. Each mill has individual ideas for the specific producer.

Many ideas originate with the pipe producer, who joins with Aetna in developing the equipment. Many ideas originate with Aetna and should... we design and build more butt weld pipe mills than any other manufacturer.

Here are two familiar examples — the Rotary Hot Saw and the Rotary Kick-out. Right now, Aetna's engineers have several ideas on the drawing boards for butt weld pipe. You will hear about them soon.

Whether your present pipe mill needs modernizing or replaced, Aetna-Standard is the manufacturer with the experience and the new ideas.

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THE AETNA-STANDARD ENGINEERING COMPANY

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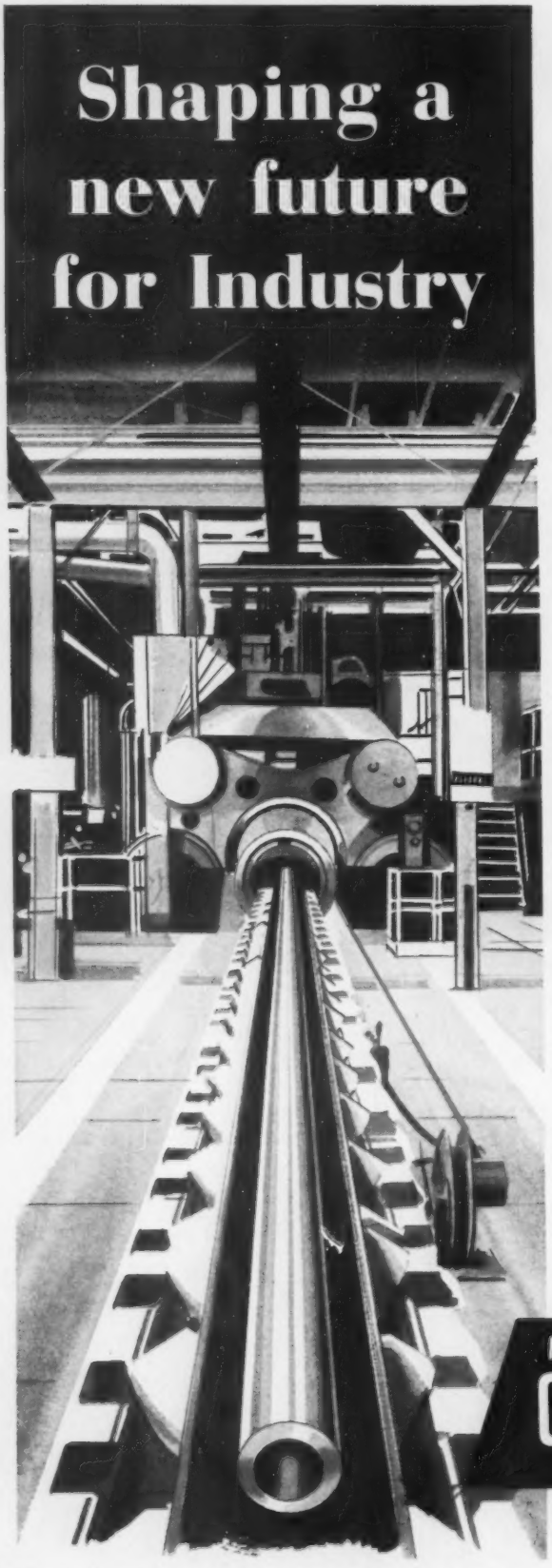
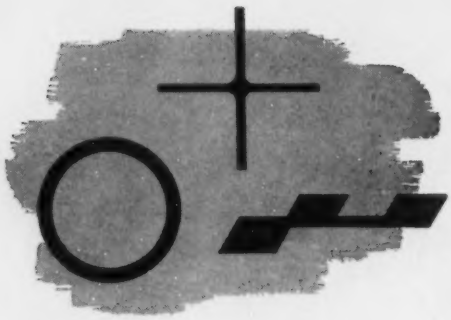
Shaping a new future for Industry





CURTISS-WRIGHT extrudes steels in shapes, lengths and sizes never before possible

Curtiss-Wright's Metals Processing Division is pushing steels into new uses for all industries. Shapes and sizes never before possible are being extruded in constantly increasing tonnages from alloy steels, stainless, titanium and other metals.

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In fact, *double savings*—savings in
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The ends of gear teeth or splines of all kinds are deburred, chamfered, recessed or precision formed to your requirements at high production rates by these Sheffield machines.

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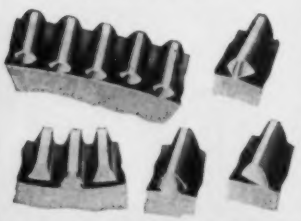
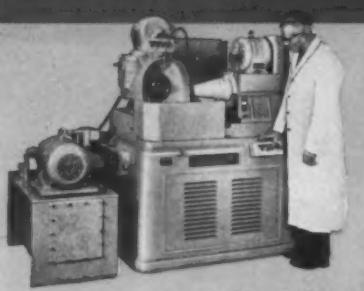
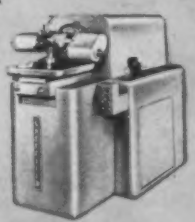




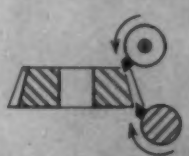
340 Series Machines Chamfer or Deburr:
120 Gear Teeth per Minute
using a Hollow Mill
60 Gear Teeth per Minute
using a Pencil Cutter

380 Series Machines Deburr:
250 Gear or Spline Teeth per Minute **using a Reciprocating Chipper Tool**

370 Series Machines Deburr:
250 Spline Teeth per Minute **using a Flytool**



350 Series Machines Deburr:
300 Spiral Bevel or Hypoid Teeth per Minute, **both sides simultaneously using Two Flytools**



Gear Deburr Grinder removes burrs from
1200 Spur or Helical Gears per Hour

7233

For descriptive literature on this equipment write to Div. 810, The SHEFFIELD CORPORATION, Dayton 1, Ohio, U.S.A.

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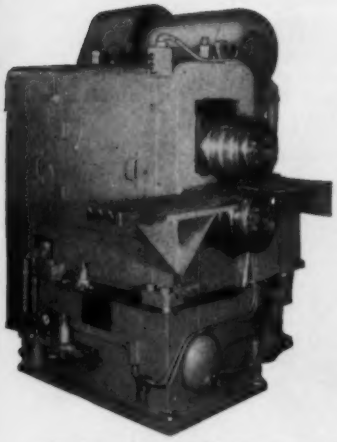
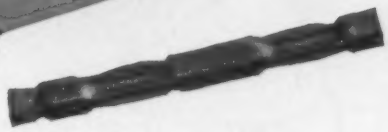


from the forging roll . . .



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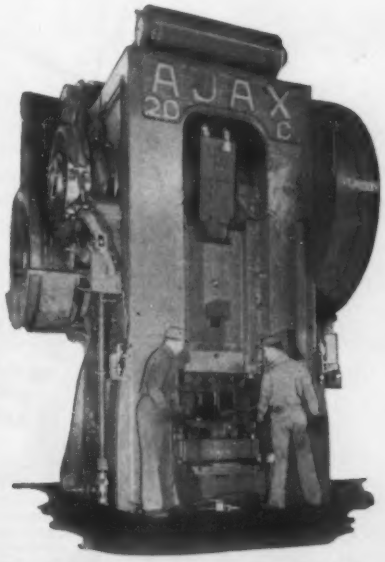
PRE-ROLL YOUR FORGING BLANKS . . .

FOR METAL SAVING • LONGER DIE LIFE • BETTER FIBRE FLOW

AJAX ROLLS are built in seven sizes to pre-roll forging blanks ranging from Connecting Rod blanks to the largest Airplane Propellers. Illustrations show Automobile Connecting Rod blank formed (above) and press-forged (below) on **AJAX HIGH SPEED FORGING PRESS.**

. . . to the forging press



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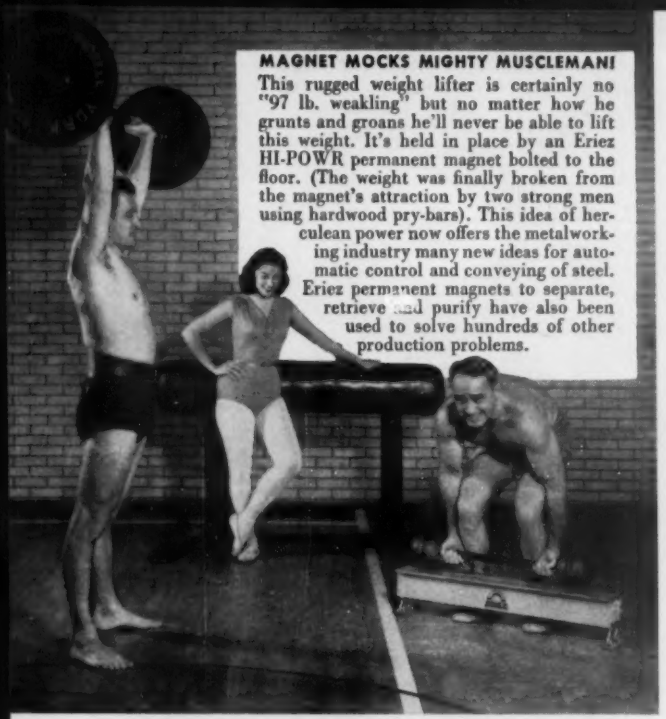


MAGNET MOCKS MIGHTY MUSCLEMAN!
This rugged weight lifter is certainly no "97 lb. weakling" but no matter how he grunts and groans he'll never be able to lift this weight. It's held in place by an Eriez HI-POWR permanent magnet bolted to the floor. (The weight was finally broken from the magnet's attraction by two strong men using hardwood pry-bars). This idea of herculean power now offers the metalworking industry many new ideas for automatic control and conveying of steel. Eriez permanent magnets to separate, retrieve and purify have also been used to solve hundreds of other production problems.

Important metalworking news!

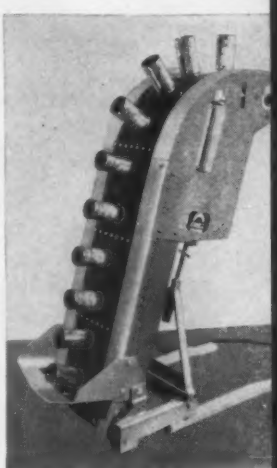
How you can hold . . . control . . . and convey with Eriez Permanent Magnets!

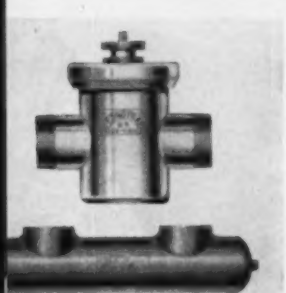
An entirely new concept in conveying and controlling metals and metallic parts is made possible by the introduction of Eriez Permanent Magnets to the metalworking field. Used for years as magnetic separators in varied industries, these lifetime-powered magnets offer many new ideas for automation. Eriez HI-POWR magnets are so strong they can bring moving metal to a dead stop. And they convey pipe, tubes, sheets, conduits, etc., at high speeds to maintain peak production. Pickup is faster, and there's less product damage caused by slippage and sag. Less conveyor space is needed (Eriez Magnets convey horizontally, vertically and up steep inclines). And no electric motors are required; you get years of trouble-free service with no power consumption. *All Eriez Magnets are non-electric, self-contained. They have no wires or attachments. Powerful Alnico V magnetic elements are guaranteed indefinitely. There is no operating cost; first cost is the only cost.*

Magnetic ideas from ERIEZ

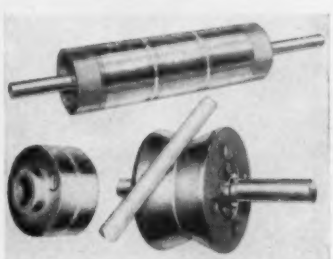
ERIEZ HI-POWR MAGNETIC SEPARATORS — ERIEZ HI-VI VIBRATORY EQUIPMENT

ERIEZ MAGNA-MOVER (MAGNETIC CONVEYOR-ELEVATOR)
For automatic handling of such ferrous items as nails, bolts, cans, blanks, scrap, finished parts, etc. Moves materials at speed of 85 FPM, up inclines to 90°. Needs only 18½" x 37" floor space; fork-like legs (1½" high) fit under tables, machines, etc. Gently curved radius permits handling of relatively large objects. Lowers production costs; increases output. Hopper prevents loss of small parts being fed to the conveyor. Extended transition section for easy discharge into bins, pallets or other machinery. Also available: *Magna-Rail* — easily installed on existing lines directly under belt to convert ordinary belt conveyors into *magnetic* conveyor-elevators for all metal parts.





ERIEZ PERMANENT MAGNETIC PIPELINE FERROTRAPS
Most efficient magnetic separators for removing unwanted iron from most anything that flows through a pipeline! Two styles, depending on diameter of pipe or special need. Either type is quickly installed, easily cleaned by merely removing the magnetic element. Three to four times more magnetic area than old-style pipeline separators. Withstand high pressures. Ideal units for removing large iron contamination and miscroscopic fines from coolant lines, circulating oil systems, etc.



ERIEZ MAGNETIC ROLLS
Small-diameter, flat-faced; V-type pipe control. Installed singly or in groups, *flat-faced permanent magnetic rolls* are extremely useful for automatic feeding, conveying and spot control of sheets. Eliminate drifting, cobbles, untrue cuts . . . reduce downtime and rejects. Provide absolute control during baking, painting, trimming, etc. Easily installed on present systems. *Eriez V-type rolls* control and convey pipe from one location to another at capacity speeds, horizontally, vertically or up inclines. Positive hold prevents rebound, assures control during many operations. Decrease take-away time, provide shorter conveyor lines, elininate direct drive rolls and motors.

New! Eriez HI-VI Vibratory Equipment

First complete line of electro-permanent magnetic equipment operating at 3600 CPM directly off an AC line. No rectifier needed! . . . just plug in. Greater vibratory output with less power consumption. Less maintenance; lower installation costs. Lifetime-guaranteed Alnico V magnetic element (heart of the unit) produces an exclusive "double action" drive for more productivity.

Write for complete information on HI-VI Unit (bin) Vibrators to keep bulk materials flowing freely. HI-VI Vibratory Feeders for accurate, controlled feed.

ERIEZ SHEET FANNER MAGNETS
Here's the magnet to speed up sheet metal handling and increase production. Slow, costly hand separation is completely eliminated . . . no more double feeding, no scratched surfaces, no cut fingers. An Eriez Sheet Fanner Magnet placed next to a pile of sheet metal automatically lifts the top sheet into the air, allows fast, safe removal. When the top sheet is removed, the following one automatically rises. Ideal for irregular and odd-shaped sheets. Available in five strengths.

Eriez factory-trained field men, backed by extensive laboratory and engineering know-how, will be happy to study your particular metal handling problem and offer helpful "Magnetic Ideas." Our representatives are always glad to work with your engineering department or consulting engineers on any problem, large or small. For additional information concerning magnetic problems in the metalworking industry, or for additional data concerning any of the products shown, write to Eriez Manufacturing Company, **1001** ***Magnet Drive, Erie, Pa.***

For Precision...Use BISHOP

Resistant to:
Corrosion
Heat
Shock
Stress
Vibration

STAINLESS STEEL Small Diameter Tubing
(.008" to 1.000" O.D.)

NICKEL and NICKEL ALLOY Tubing
(up to .625" O.D.)

AIRCRAFT TUBING

FABRICATED TUBULAR PARTS:
Flanged
Flared
Milled
Slotted
Swaged
Threaded

PLATINUM GROUP METALS AND ALLOYS:
Bimetals
Electrodes
Foil
Laboratory Apparatus
Precious Metal Catalysts
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AND DEVELOPMENT SERVICES

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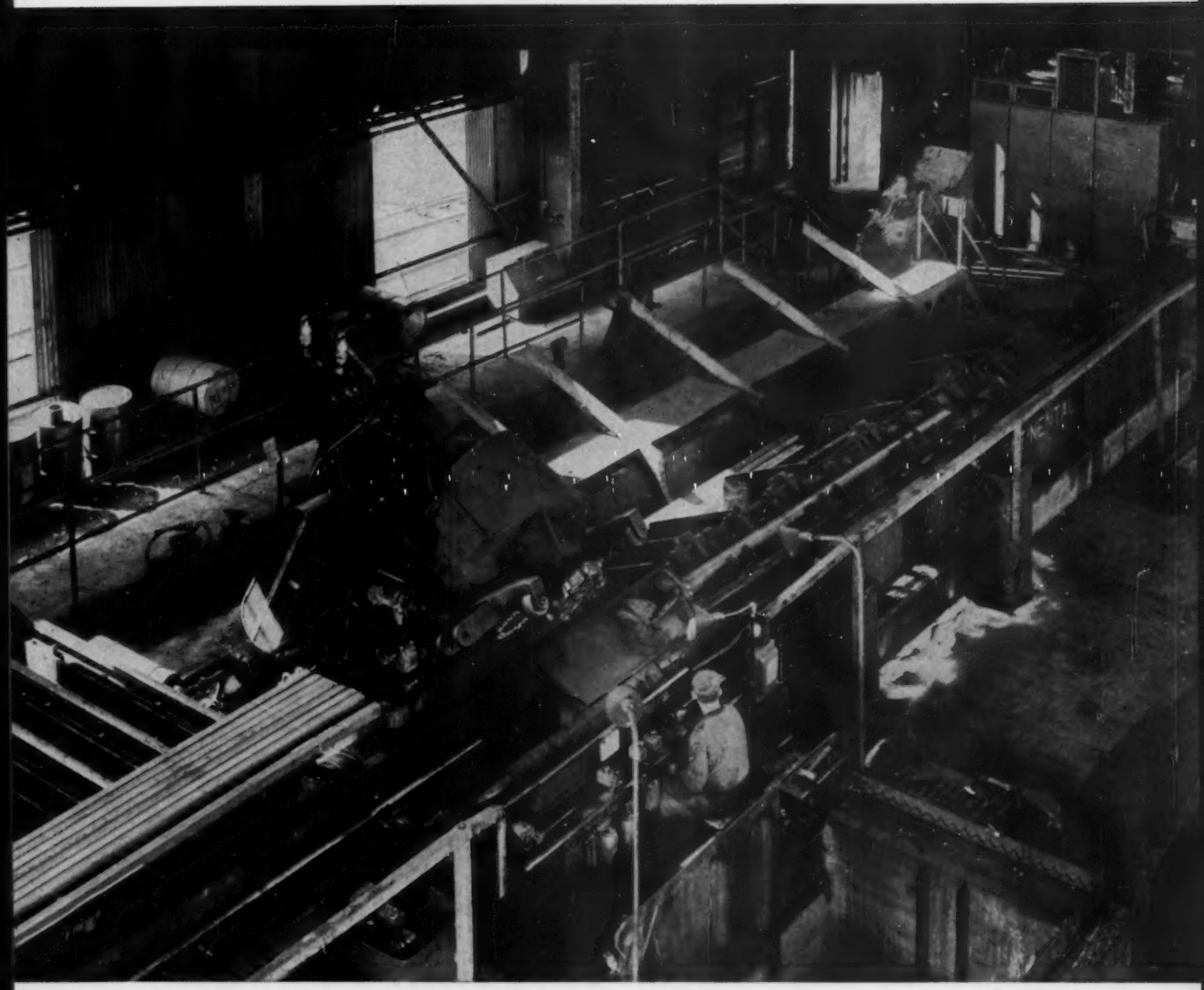
METALS

JB

J. BISHOP & CO. PLATINUM WORKS
Malvern, Pennsylvania

"Also, Now Available Glass-to-Metal Sealing Alloys."



BLAW-KNOX makes what it takes

for continuous, mechanical chipping

The Continental Chipper with auxiliary equipment is a complete mechanical system for sorting, handling, inspecting and chipping billets. This integrated system has demonstrated in-service cost savings over manual conditioning. It represents a wise investment in long range modernization programs for conditioning for subsequent rolling in merchant and bar mill operations.

Product quality improvement is immediate, positive. Precise chipping is accomplished by a non-traveling cutter head under which the billet moves in a fashion similar to a milling machine. All chipping is done at close range, immediately in front of the operator. This single operator, located in front of the cutter head controls the entire operation including all material handling.

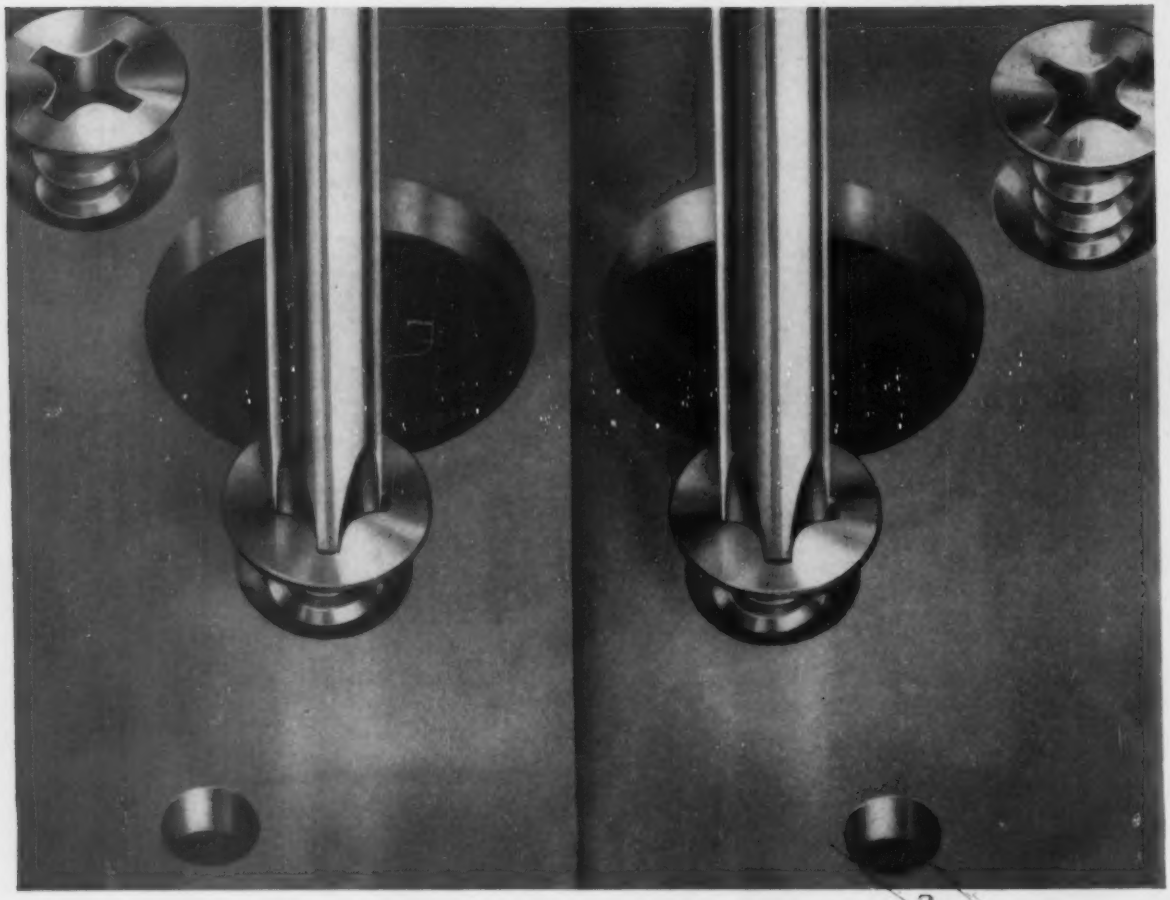
The chipper is equipped with special interlocking devices which eliminate unsafe operation. Usual chipping bay hazards such as high pressure air lines, improperly handled chisels, and flying chips are removed. The Continental Chipper accommodates billets up to 30 feet in all merchant and bar mill sizes.

For complete details, write for illustrated booklet.

50th Anniversary
BLAW-KNOX
1906-1956

BLAW-KNOX COMPANY
Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

CONTINENTAL



They may Look the same but...

American is the name!

Your true cost of modern fasteners consists of four factors:

1. price **3. quality**
2. service **4. research**

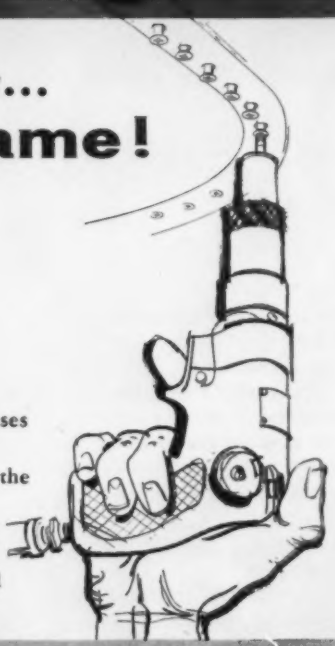
Sometimes there are local price differentials for the moment. But no one gives you more of all four than American.

American Gives You More of All Four

. . . *in service*, where American's controlled servicing meets any production schedule . . . a furniture manufacturer, for instance, uses more than 7 million American Phillips fasteners a year.

. . . *in quality*, where American's quality standards are highest in the industry to assure conformance of every product run.

. . . *in research* that has developed not only the original Phillips Head fastener but saved an aircraft manufacturer substantial sums by showing him how to change from a costly stainless steel fastener machined from bar stock to a sturdy cold-headed unit.

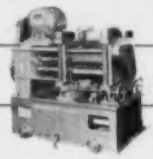


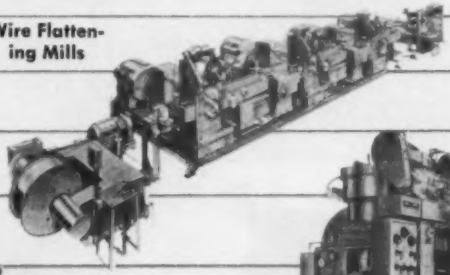
If this sounds unique in the industry, it is. For nowhere will you find more of the four basic features you want than from American Screw Company — price, service, quality, research.

Make your own comparisons . . . send us your inquiry for price and delivery or your specifications for special fasteners. Write:

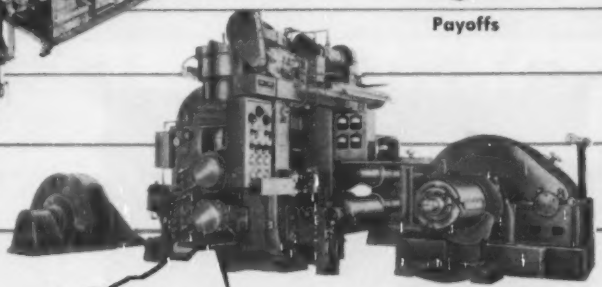
American!

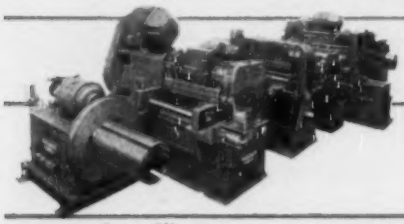
AMERICAN SCREW CO. • WILLIMANTIC, CONN.
NORRISTOWN, PA. • CHICAGO, ILL. • DETROIT, MICHIGAN


Coilers


Wire Flattening Mills

Payoffs

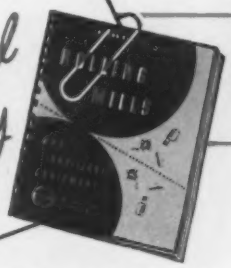

Two High Strip Rolling Mills

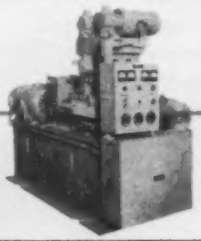

Gang Slitters

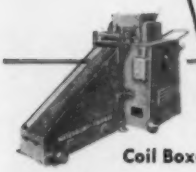
MEMO

Re Rolling Mill Modernization

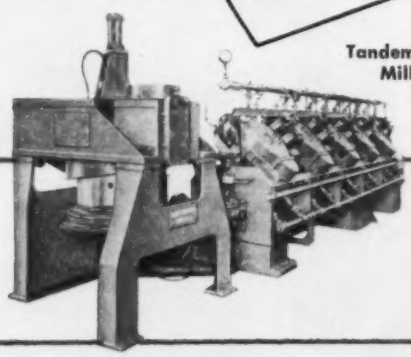
Look Into Latest Waterbury Farrel Mill Machinery

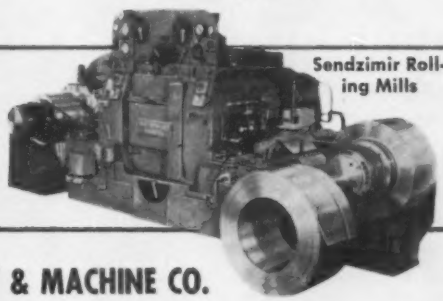



Four High Strip Rolling Mills


Coil Boxes

NEW, 48 PAGE MILL MACHINERY CATALOG. Gives a complete picture of the various types of mills and auxiliary equipment built by Waterbury Farrel. Send for your copy, today.


Tandem Rod Mills


Sendzimir Rolling Mills

THE WATERBURY FARREL FOUNDRY & MACHINE CO.

WATERBURY, CONN., U. S. A.

Sales Offices: Chicago • Cleveland • Millburn, N. J.

ROLLING MILL EQUIPMENT

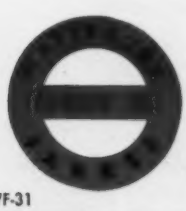
Four-High Rolling Mills
Gang Slitters
Grading Mills
Mint Mills
Sendzimir Rolling Mills
Special Rolling Mills
Two-High Rolling Mills

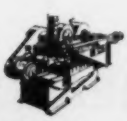
AUXILIARY EQUIPMENT

Coil Boxes
Coilers
Coil Lifts and Transfers
Belt Wrappers
Edgers
Handling Equipment
Payoffs
Straighteners
Winders

ROD AND TUBE MILL EQUIPMENT

Draw Benches
Tandem Rod Mills
Three-High Rod Mills
Two-High Rod Mills


WF-31


Bolt, Nut & Screw Machinery

Power Presses

Rolling Mill Machinery

Wire Mill Equipment

Sendzimir Mills & Other Special Machinery

FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

BIRTHPLACE OF A GIANT

In 1644, twenty-two years after the massacre at Falling Creek, Virginia and the destruction of America's first blast furnace, the first producing ironworks was started on the banks of the Saugus River, halfway between Boston and Salem, Massachusetts. These works included a small blast furnace and a forge.

At the Saugus Works the first casting in America was made by Joseph Jenks. It was for an iron cooking pot of about one quart size. The pot and lid together weighed about 3 pounds, and on the inside measured 4½ inches in width and depth both. From this small casting today's gigantic iron and steel industry has grown.

The J. E. Baker Company is proud of their part in this tremendous growth. To help producers get more uniform ingots and increased furnace efficiency at lower refractory costs, BAKER'S MAGDOLITE, the original dead-burned dolomite was developed. Down through the years, BAKER'S MAGDOLITE has maintained a superior product that is constantly 5 ways better: Composition, Preparation, Strength, Economy and Quality. The next time you order dead-burned dolomite, specify BAKER'S MAGDOLITE.

2-55

ANOTHER FAMOUS FIRST

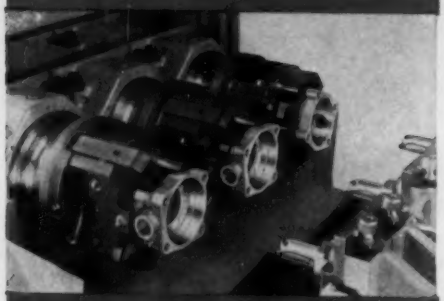
JEBCO
PRODUCTS
SINCE 1889

BAKER'S MAGDOLITE

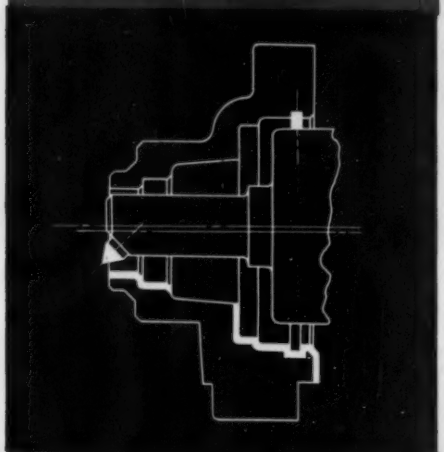
The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO



Showing parts mounted in the chuck. Without chuck changes, any of three parts having different exterior forms but identical interior contours can be accommodated.



12 operations are performed in one machine cycle. Heavy lines denote surfaces machined.

Intricate contouring is fast, accurate—

12 operations in one cycle!

Direct cam action—no levers—provides Ex-Cell-O Precision Boring Machines with accuracy, versatility and speed in difficult contouring operations.

In the application shown here—contouring an internal form in die-cast aluminum end covers—limits on diameters are held as close as plus or minus .0005 inch, and three work pieces are completed at a time. 12 separate operations are performed in one machine cycle, including precision boring, facing, chamfering and grooving.

Cams can be changed in minutes. Cam assembly swings out for quick, easy change. All motors are outside the base.

Another Ex-Cell-O feature is the large chip chute, cast as an integral part of the base. There are no openings where chips or coolant can enter the base. Contact your Ex-Cell-O representative or write direct for complete information.

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

56-52

XLO

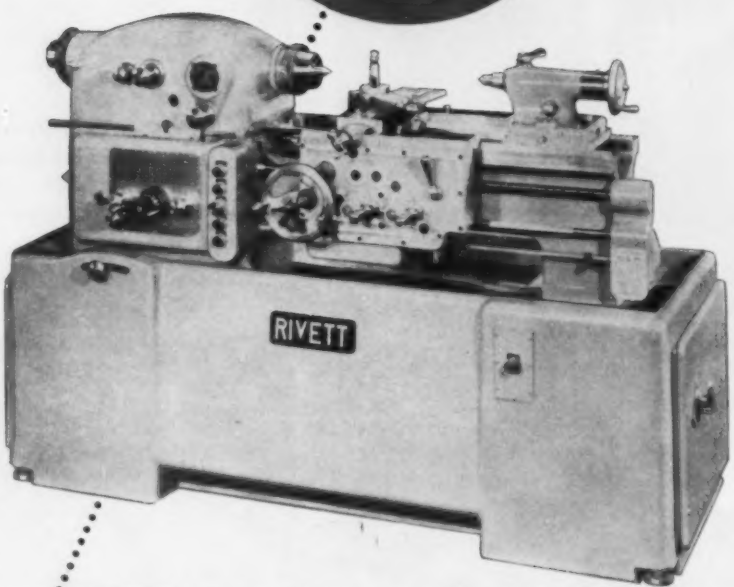
At left: The Ex-Cell-O Styled 312 Cam Operated Precision Boring Machine. A smaller model, the Ex-Cell-O Style 208, is also available because of the demand for this type of machine.

2 FOR 1

RIVETT 1020S

HAS WHAT IT TAKES TO MAKE AN OUTSTANDING LATHE

★ 40% heavier than comparable lathes. Weighs 3900 lbs. ★ Back gearing for power cuts—belt drive free of all gearing for high speeds. Range from 22 to 3600 R.P.M. ★ 12¾" wide hardened steel ways of bed absorb heavy cutting force. ★ Infinite spindle speeds through trouble-free mechanical drive. ★ Push button controls for complete operation. ★ Neutral clutch stops spindle without stopping drive. ★ Three bearing mounts for spindle. ★ Collets mount directly in spindle. ★ Hand wheel for turning headstock spindle ★ Anti-friction bearings used throughout. ★ Gear box gives 72 feeds and 84 threads from 2 to 240 per inch. ★ Automatic lubrication. ★ Hardened and ground feed screws.



RIVETT 1020S is an Instrument Lathe and an Engine Lathe

A double-duty machine—combining the feather-touch sensitivity of an instrument lathe with that heavy-biting ruggedness which carbide cutting tools require. This powerful geared-head lathe qualifies for any turning within its 12½" swing and 20" centers.

Bulletin 1020A has proof of how outstanding this Rivett would be in your shop. Write for copy today.

RIVETT LATHE & GRINDER, Inc.

Dept. 1A-9, Brighton 35, Boston, Massachusetts

You can use other lathes . . . or employ other types of metalworking machines . . . but on no other tool can you get so much production with such fine precision as on a Rivett.

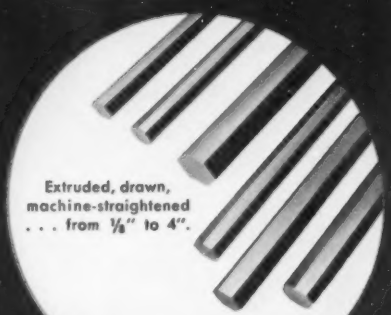
not just brass but

Titan brass

mill products...for your metal money's worth

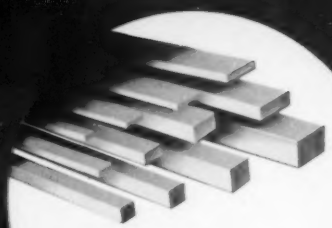
Brass rounds available from 1/16" to 10" diameter.

Rounds



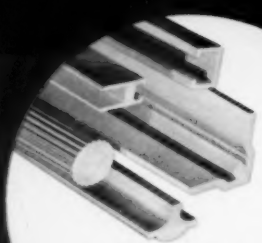
Extruded, drawn, machine-straightened . . . from 1/8" to 4".

Hexagons & Octagons



Squares up to 4 1/4". Rectangles extruded, drawn and straightened—up to 5" maximum diagonal.

Rectangles & Squares

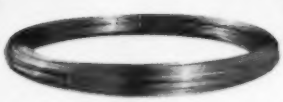


Extruded to your exact requirements.

Special Shapes

Bronze boat shafting . . . tough, strong, corrosion-resistant Titan Naval Brass.

Tru Shaft



High-quality wire for making brass rivets, bolts, screws, other fasteners . . . available in either 65-35 or 70-30 copper-zinc alloys.

Wire

All Titan rod mill products are of highest quality brass. All sizes of finished Titan dies are ready for production and prompt delivery.

Rounds, hexagons, octagons, rectangles, squares and special shapes can be delivered in the following brass alloys: Free-Cutting Brass, Naval Brass, Leaded Naval Brass, Manganese Bronze. Extruded Leaded Nickel-Silver and Free-Cutting Commercial Bronze in limited sizes and shapes.

Send us your order.

If you want more details on Titan rod and wire mill products, send coupon below:

Dept. B
Titan Metal Manufacturing Co., Bellefonte, Pa.
Gentlemen:

☐ Please send 20-page brass mill products booklet — "For Your Metal Money's Worth."
☐ Please have your representative call.

Name..... Title.....
Company.....
Address..... City & State.....

Titan

METAL MANUFACTURING COMPANY

Bellefonte, Pa. Offices and Agencies in Principal Cities

RODS · FORGINGS · DIE CASTINGS · WELDING RODS · WIRE

Quality Alloys by Brass Specialists

Can I afford a Towmotor?

You can!

Typical savings produced by Towmotor Fork Lift Trucks are revealed in recent Certified Job Studies which show that: For one company, one Towmotor Fork Lift Truck paid for itself in 10 months. For another company, six Towmotor units saved $50,000 in a single year.

It's an amazing fact that most companies now using outdated materials handling methods are, through hidden costs, already paying the price of Towmotor equipment. To discover how you can save money on your materials handling, call your Towmotor representative today! . . . or write for Certified Job Studies covering your industry. TOWMOTOR CORPORATION, Div. 1509, 1226 E. 152nd St., Cleveland 10, Ohio.

Read how a Manufacturer of metal castings cut over-all handling costs 60%. Ask for Job Study #108

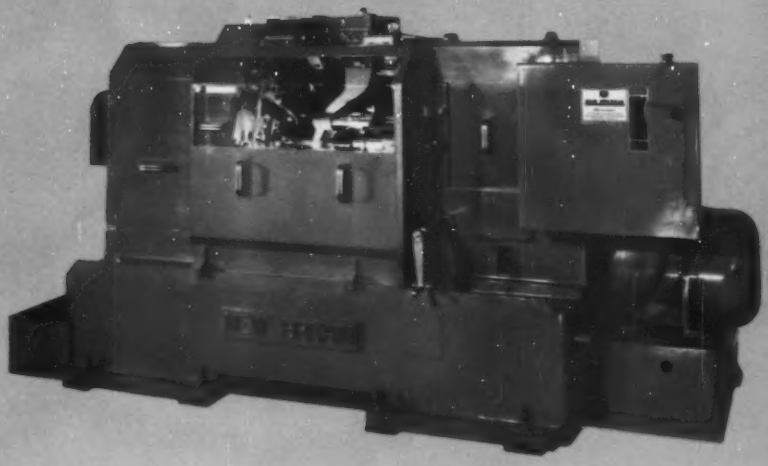
America's ***best engineered*** *fork lift truck*

TOWMOTOR
THE ONE-MAN-GANG ®

THERE'S ONLY ONE FORK LIFT TRUCK CALLED TOWMOTOR

WHEREVER YOU TURN
on multi-spindle bar machines
NEW BRITAIN HAS THE MACHINE FOR YOU

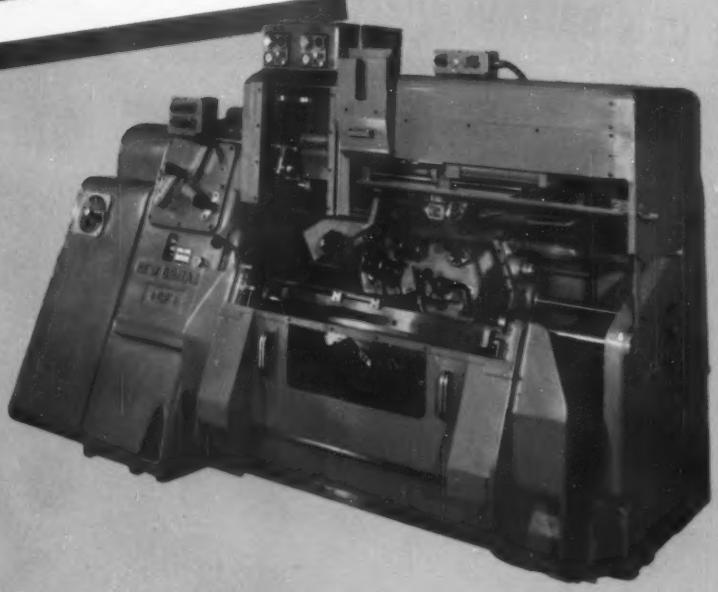
THE NEW BRITAIN MACHINE CO.
Model 62
Automatic Bar
Machine
NB



The new Model 62 New Britain bar machine has an independent radial cross slide in every position — opening new possibilities for effective tooling. New Britain "accuracy features" include spindle carrier lifting to eliminate wear during index, plus rigid locking of the carrier during the cutting cycle. Magazine loading available if desired.

WHEREVER YOU TURN
long or short runs
NEW BRITAIN HAS THE MACHINE FOR YOU

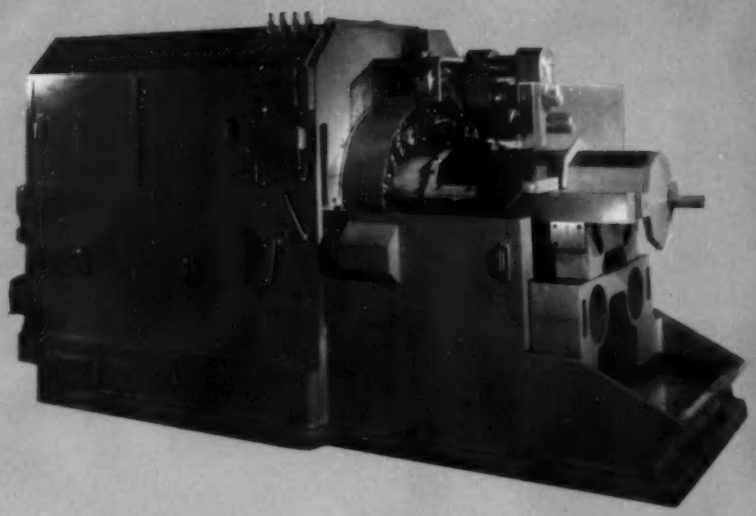
THE NEW BRITAIN MACHINE CO.
Model 11/70
New Britain +GF+
Copying Lathe
NB



The original New Britain **+GF+** copying lathe has grown into an extensive line, to meet the demand for the wide variety of applications for its better copy-turning principle. Regardless of length of run or the variety of pieces you make, you can use the New Britain **+GF+** profitably. Basic advantages are: fast setup, inexpensive tooling, elimination of the chip problem, minimum operator fatigue, and dimensional accuracy with good surface finish to reduce grinding allowances. Optional features include automatic re-cycling, automatic loading and ejecting.

WHEREVER YOU TURN
castings, forgings or pressed metal pieces
NEW BRITAIN HAS THE MACHINE FOR YOU

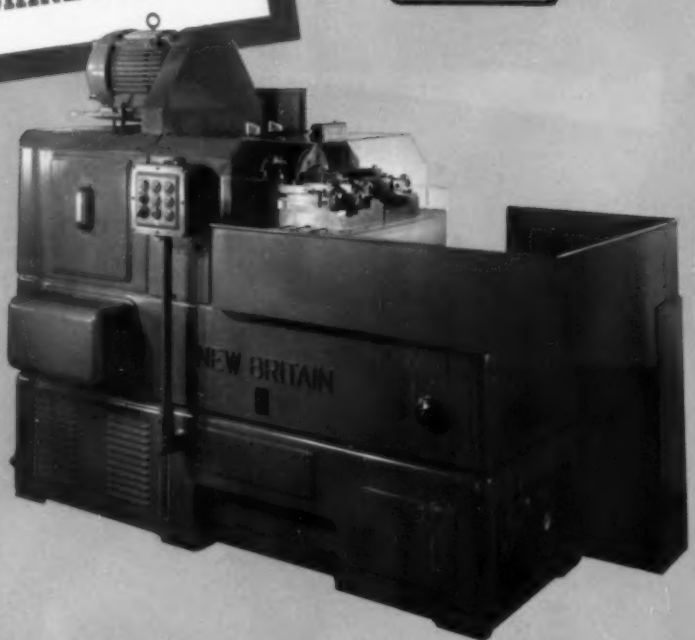
THE NEW BRITAIN MACHINE CO.
Model 810
Automatic
Chucking Machine
NB



Versatility, accessibility, quick setup and sustained high production of precision parts are what you look for in an automatic chucker. New Britains are famous for these features all over the world. Perhaps you are also thinking of the possible savings which automatic loading, unloading and automatic gauging could effect. If so, you will want to learn about the imaginative use of automated production which New Britain engineers are applying to chucker work these days. You can now handle bigger pieces than ever on New Britains too — up to fifteen inches in diameter.

WHEREVER YOU TURN
or bore precision contour work
NEW BRITAIN HAS THE MACHINE FOR YOU

THE NEW BRITAIN MACHINE CO.
Model 37
Precision Boring
Machine
NB

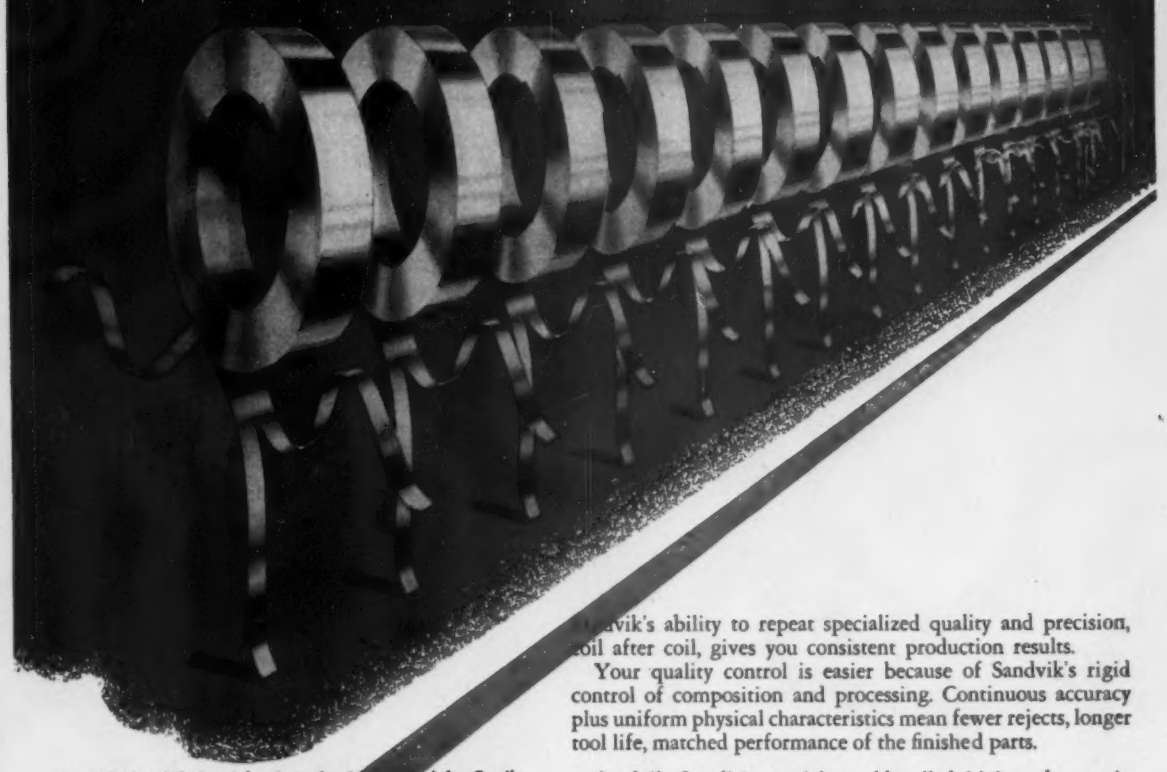


New Britain precision straight and contour boring machines provide a new approach to machining parts that would be problem pieces on any other type of equipment. These simple, fast, accurate machines require minimum attention and utilize inexpensive single point tools. They make the most profitable use of automatic loading, gauging and tool adjustment where these features fit the job requirements. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

Sandvik Spring Steel's

Matched Performance

gives you continuous quality production



Sandvik's ability to repeat specialized quality and precision, coil after coil, gives you consistent production results.

Your quality control is easier because of Sandvik's rigid control of composition and processing. Continuous accuracy plus uniform physical characteristics mean fewer rejects, longer tool life, matched performance of the finished parts.

Sandvik Swedish specialty cold rolled high carbon strip steels are available:

- **In special analyses for specific applications.**
- **Precision-rolled in thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered.**
- **Polished bright, yellow or blue.**
- **With square, round or dressed edges.**
- ***Wide range of sizes in stock—also slitting facilities available.***

Ask your nearest Sandvik office for further information or technical assistance.

Sandvik Swedish Specialty Strip Steels [illegible]ed for Textile Machine Parts such as sinkers, needles, etc. • Band Saws (metal, wood and butcher) • Conveyor Shutters • Clock and Watch Springs • Compressor Valves • Doctor Blades • Feeler Gauges • Knives such as cigarette knives, surgical instruments, etc. • Razor Blades • Reeds • Shock Absorbers • A Wide Variety of Springs • Trowels • Vibrator Reeds • Piston Ring Segment and Expanders, etc.

SANDVIK *Coromant*
CARBIDE TIPPED TOOLS AND BLANKS

- In a wide variety of tools and blanks from stock — including many shapes and designs which have been considered "specials" before.
- In all standard grades with improved performance to suit a wide range of applications.
- In the new, time saving "Coromant Combination Cutter."

From ore to finished product within the same company

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SANDSTEEL SPRING DIVISION • Fair Lawn, N. J. • Industrial Springs
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SS-95

This Hallowell laboratory bench was custom built for a leading chemical manufacturer

This fine bench has a heavy-gage stainless steel top, fitted with chrome fixtures for vacuum, air and electricity. Flush-front drawers with stainless steel pulls glide smoothly on roller bearings. There is ample storage space with sliding doors and adjustable shelves in the enclosed cabinet base. Finish is baked-on charcoal gray enamel over a phosphate undercoat. You can have benches like this one in *your* laboratory or shop—designed and built to meet your specific requirements, and delivered promptly. Write us about your bench problem today. Hallowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

STANDARD PRESSED STEEL CO.

HALLOWELL SHOP EQUIPMENT DIVISION SPS

JENKINTOWN PENNSYLVANIA

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THESE ESTABLISHED LOW VOLATILE METALLURGICAL COALS

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beautiful blacks
for superior product appeal . . .
EBONOL OXIDE FINISHES
For STEEL, COPPER, BRASS and ZINC
• maximum wear resistance
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With extensive laboratory facilities, a staff of trained technicians in the plant and in the field, and years of practical experience, Enthone Incorporated is exceptionally well equipped and qualified to study your metal blackening requirements (or any other difficult metal finishing problems) and recommend a practical solution. Write now, outlining your needs.
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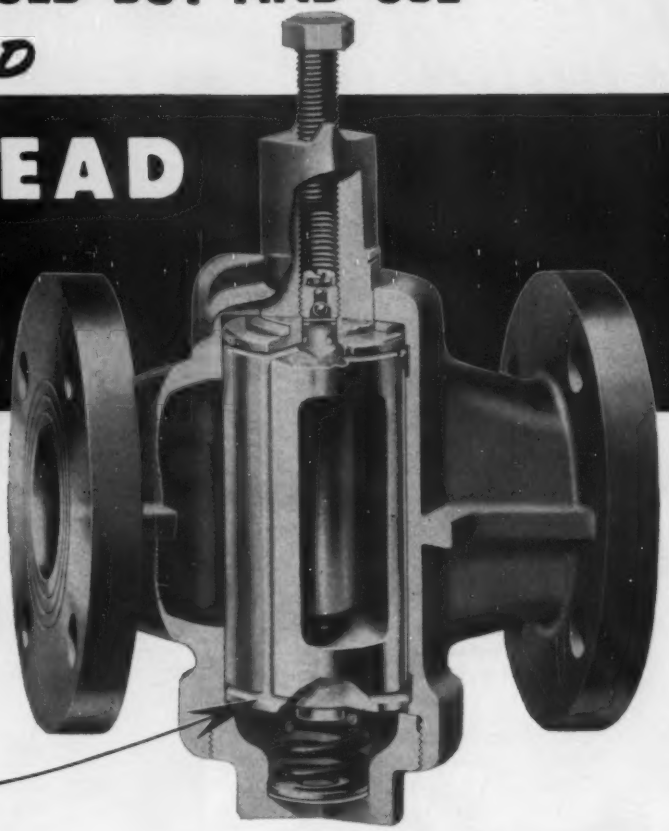
Metal Finishing Processes • Electroplating Chemicals
Service Representatives and Stock Points in Principal Cities of U.S.A. and Canada, Brazil, England, France, Sweden, and Germany

No. 5* of 12 REASONS WHY
YOU SHOULD BUY AND USE

LOW-PRICED

HOMESTEAD
Lubricated
PLUG VALVES



*SELF-FREEING PLUG PREVENTS STICKING

Homestead's exclusive completely controlled lubricant system positively prevents sticking by its instant, piston-like movement of the plug downward at the start of each lubrication. Spring and line pressure return it to stem-sealed position.

This is only **one reason why you should buy and use low-priced** HOMESTEAD LUBRICATED PLUG VALVES.

HERE ARE ALL TWELVE

1. Extra long valve life assured by very close tolerance between sealing surfaces.
2. Straight line fluid flow—streamlined ports—minimum resistance to flow—minimum pressure drop.
3. Triple head seal—two lubricant rings and reinforced Teflon stem seal prevent leakage.
4. Easy turning—plug floated on Teflon washer and reinforced Teflon ring.
5. Self-freeing plug prevents sticking.
6. Full-threaded screw prevents dirt being forced into lubricant system.
7. Quarter-turn fully opens or closes.
8. Reinforced Teflon stem seal—no cold flow—continuous, positive seal.
9. Seating surfaces protected in both open and closed positions.
10. High pressure lubricant system provides full lubricant seal around ports.
11. Leak-proof double ball and lubricant sealed check valve. No springs. No maintenance.
12. Two lubricants handle most services.

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VALVE MANUFACTURING COMPANY
"Serving Since 1892"

P. O. Box 23 **Coraopolis, Pa.**

Without obligation, send Reference Book 39—Section 5 on HOMESTEAD LUBRICATED PLUG VALVES.

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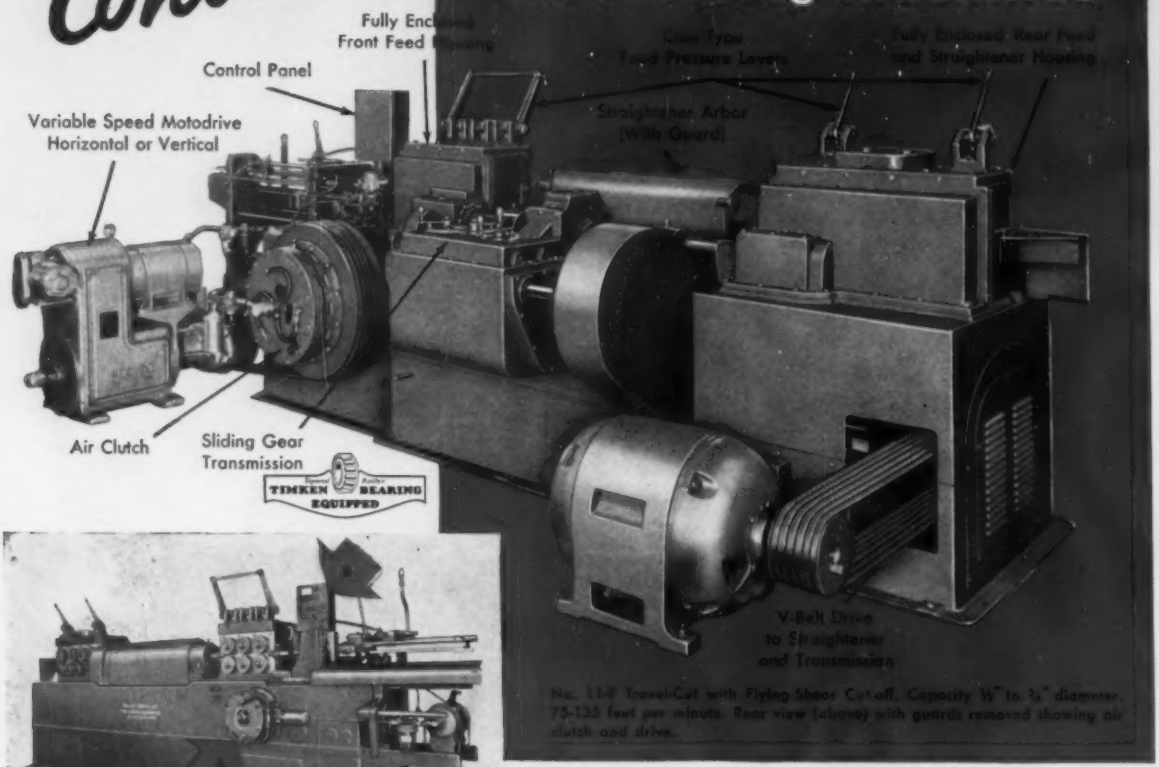
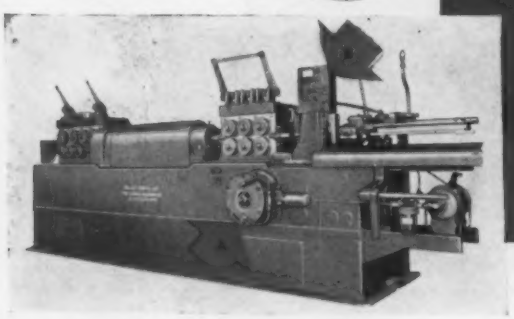
Better Quality Control*

LEWIS

introduces the Air Clutch on wire straightening and cutting machines


Fully Enclosed Front Feed Housing
Control Panel
Variable Speed Motodrive Horizontal or Vertical
Air Clutch
Sliding Gear Transmission
TIMKEN BEARING EQUIPPED
Gear Type Feed Pressure Levers
Straightener Arbor (With Guard)
Fully Enclosed Rear Feed and Straightener Housing
V-Belt Drive to Straightener and Transmission

No. 11-F Travel-Cut with Flying Shear Cut-off. Capacity ⅛" to ¾" diameter. 75-135 feet per minute. Rear view (above) with guards removed showing air clutch and drive.



Front view of No. 11-F Travel-Cut with Flying Shear Cut-off showing Air Brake "A" (with guard removed) and operating panel "B" with push-button controls for Air Clutch, Reeves Motodrive and flywheel speed Indicator Tachometer.

● Lewis engineers have added three important improvements to their famous Travel-Cut Machines for BETTER QUALITY CONTROL . . . These machines are already in service in America's leading steel and wire mills.

✳ Wichita Air Clutch permits higher cut-off speeds, eliminates shock of conventional clutch. No adjustment necessary . . . automatically compensates for wear.

✳ Wichita Air Brake eliminates conventional mechanical drag brake and is only engaged for a short portion of the cut-off cycle.

✳ Reeves Variable Speed Motodrive permits infinite adjustment of flywheel speed for perfect synchronization of the cut-off and wire feed speeds. This unique arrangement makes possible the cutting of rod WITHOUT SPOT SWELL . . . allows finer adjustment for cutting short lengths. Dial tachometer registers flywheel speed.

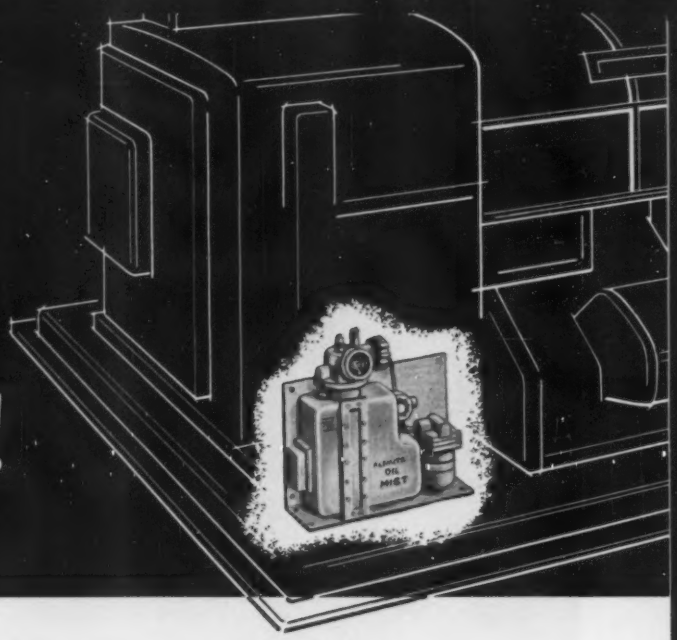
There are Standard Lewis Travel-Cut or Stationary-Cut Machines designed to straighten and cut all materials and shapes in wire or rod from .012" to ¾" at a wide range of feed speeds.

Air Clutch available on all Travel-Cut Models. Send for new brochure showing complete line of Lewis Wire Straightening and Cutting Machines.

See our Air Clutch equipped machine in operation at the Metal Show, Cleveland, Oct. 8-12, Booth No. 2002

LEWIS MACHINE COMPANY 3440 East 76th Street Cleveland 27, Ohio

save up to 90% on lubricating costs!



ALEMITE OIL-MIST AUTOMATIC LUBRICATION

multiplies bearing life...cuts product spoilage ...boosts machine output in almost every industry!

Alemite Oil-Mist Automatic Lubrication brings remarkable savings... in lubricants, man-hours, bearing life, and decreased product spoilage.

Alemite Oil-Mist *atomizes* oil into mist—distributes it through tubing to bearings—bathes all bearing surfaces with a cool film of clean oil. Maintains uniform oil film on plain and anti-friction bearings, gears and chains—despite variations in load, temperature or speed. Amazingly simple, continuous and fully automatic . . . Alemite Oil-Mist eliminates the waste and uncertainties of the "human element" in lubrication.

Let us show you how Alemite Oil-Mist provides more efficient, foolproof lubrication, at lower cost! Mail coupon below for a graphic demonstration!

8 ADVANTAGES of the ALEMITE OIL-MIST System

1. Continuous Lubrication—Constantly deposits fresh, clean film of oil on all surfaces of all bearings in the system.

2. Fully Automatic Lubrication—Can start and stop with operation of machine switch.

3. Elimination of Guesswork—No bearing can be over-looked, nor over-lubricated! Every bearing picks up only as much Oil-Mist as it needs.

4. Reduction of Bearing Temperatures—Acts as bearing coolant, can lower bearing temperatures as much as 20° F.

5. Reduction of Types of Oil—Reduces number of oils that must be stocked, handled, and applied.

6. Elimination of Downtime—All bearings in the system are constantly lubricated while machines continue to operate.

7. Extension of Bearing Life—Multiplies bearing life many times. Life of grinding machine bearings has been extended from 400 to 7,000 hours!

8. As High As 90% Less Oil Consumption—Alemite Oil-Mist usually consumes about 1/10 the amount consumed by any other oiling method!

Alemite Oil-Mist Lubricates ALL Types of Mechanisms

Anti-friction Bearings | Plain Bearings | Chain | Gear | Gear Cases

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A Product of STEWART-WARNER CORPORATION

Alemite Division of Stewart-Warner, Dept. N-96
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☐ Please send me a FREE copy of your new and complete Oil-Mist catalog.

☐ Please have your Alemite Lubrication Representative arrange a no-obligation demonstration.

My Name .....

Title .....

Company .....

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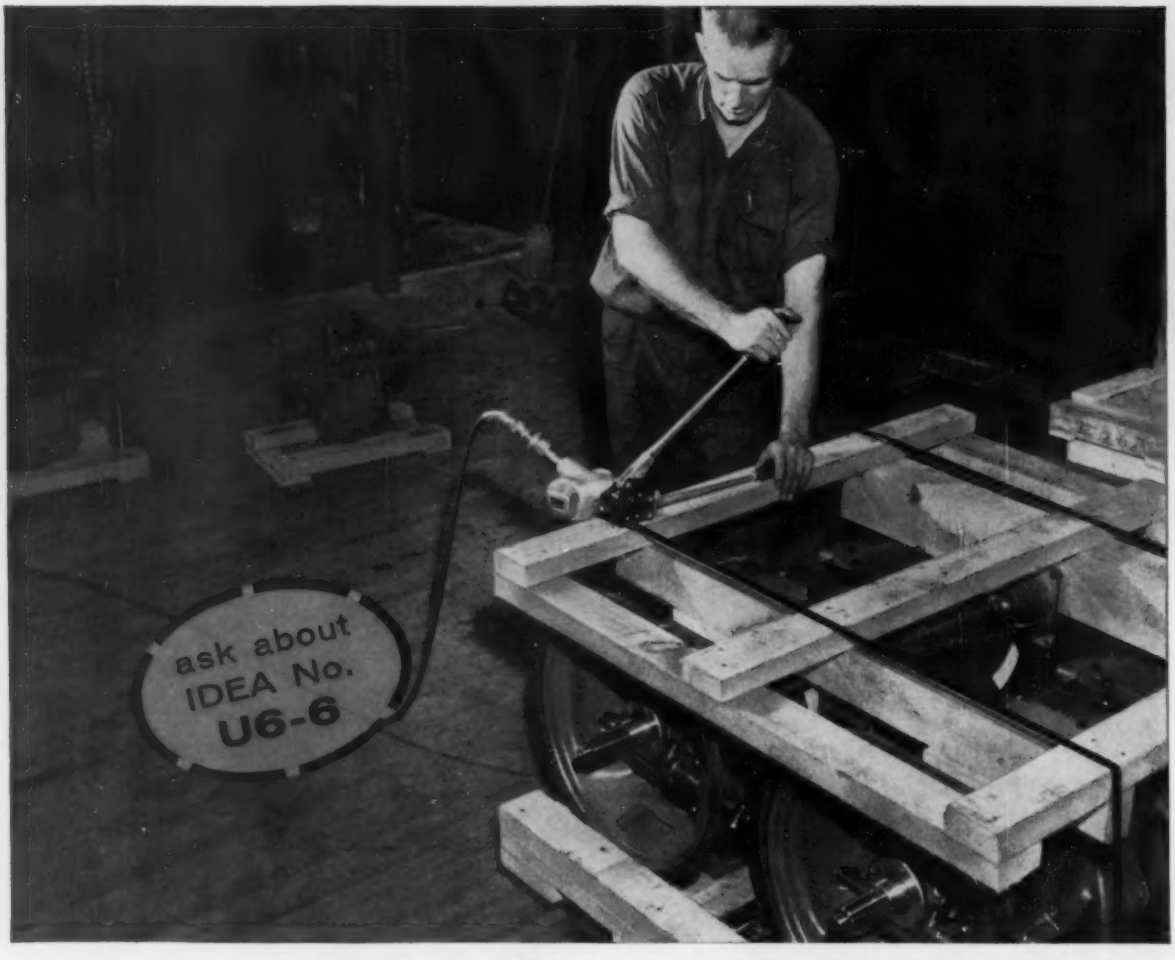
City ..... State .....



Check your AIM*. . . Fuller Manufacturing Company did . . .

Strapping transmissions saves money, speeds handling

Acme Idea Man, Chuck Deerwester, cooperated with Fuller Manufacturing Co. in adapting this steel strapping idea.

ACME STEEL STRAPPING helped Fuller Manufacturing Company, Kalamazoo, Michigan, eliminate costly crating and slow manual handling. Now, two transmissions are steel strapped to a wooden skid, with protective top frame. This is accomplished in half the time previously required for the crating operation by the same crew. (Idea No. U6-6)

The steel strapped skid loads are moved by lift-truck, can be stacked six high. Appreciable saving in material cost and storage space are realized. And, damage in transit is reduced.

***Check your Acme Idea Man.** He will show you examples of Ideas-In-Action which are being used to solve all types of packing and shipping problems. Write Dept. IFU-96, Acme Steel Products Division, Acme Steel Company, 2840 Archer Avenue, Chicago 8, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Avenue, Toronto 13, Ontario.

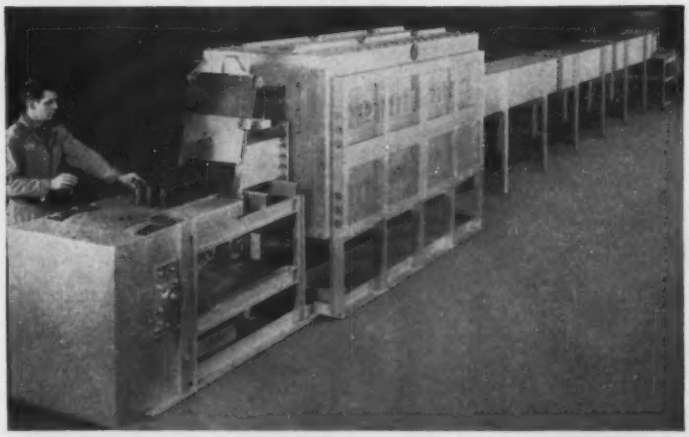
ACME STEEL STRAPPING

SELECTION GUIDE FOR BRAZING FURNACES

Check These Standard HARPER Controlled-Atmosphere Brazing Furnaces Against Your Requirements

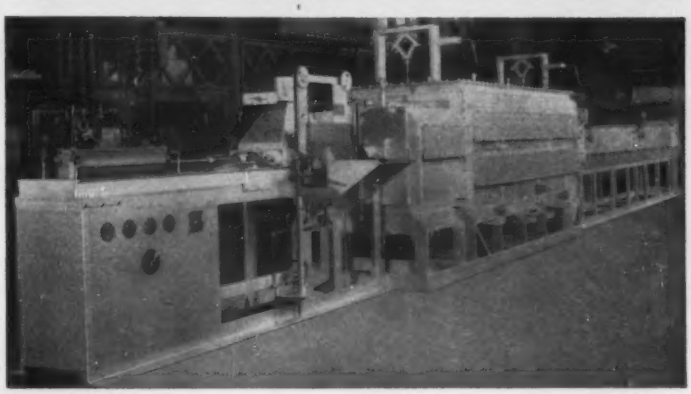
☐ **CONTINUOUS MESH BELT FURNACE**

The perfect production furnace for brazing versatility. Provides adjustable speed automatic conveyance, precluding need for special fixtures, trays, etc. Ideal for silver or copper brazing of short runs on different shapes. Belt loading up to 10 pounds per square foot at 2100°F., larger loads permitted at lower temperatures. Belt widths to 24", charge heights to 12"; production capacities to 550 lbs/hr. Completely automatic operation available.



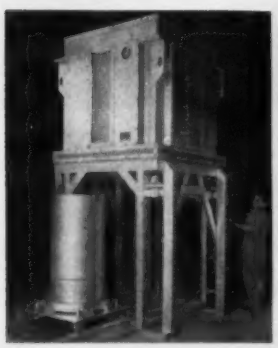
☐ **CONTINUOUS PUSHER FURNACE**

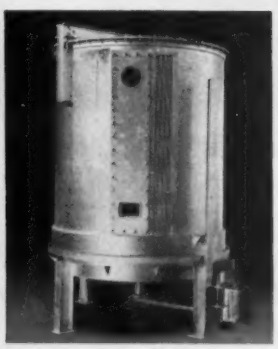
The mechanical pusher furnace is designed for heavier loading (up to 100 pounds per square foot) and is therefore most suitable for large-production silver or copper brazing runs of heavier assemblies. Trays or special fixtures often used. Provides accurate atmosphere control. Pilot plant or small production units available for manual pusher operation. Standard hot zone sizes up to 18" x 9"; production capacities to 1000 lbs/hr.



☐ **ELEVATOR FURNACE**

The best batch brazing furnace where maximum heat uniformity is important. Hearth is rolled away from furnace for easy loading, is repositioned under furnace, then raised into heating chamber. Ideal for large and/or heavy loads which must remain free of vibration during brazing. Adaptable to stainless steel brazing when muffle is used. Rapid cooling obtainable by removing work from furnace chamber. Available chamber sizes up to 150 cu. ft.





☐ **BELL FURNACE**

The bell furnace is similar to the elevator except that the assemblies to be brazed may be stationary throughout the cycle. The load is placed on a fixed hearth and the furnace bell lowered over it. Generally available with nickel alloy heating elements for temperatures up to 2050°F. Special designs may incorporate silicon carbide for higher temperatures. Ideal for stainless work with muffle.

If you want more information on these or other Harper Furnaces, just check the coupon or visit Harper Booth 724 at the Cleveland Metal Show.

HARPER
ELECTRIC FURNACES

FOR

CONTINUOUS BRAZING, SINTERING, WIRE ANNEALING, BRIGHT ANNEALING, ANNEALING, FORGING and RESEARCH

HARPER ELECTRIC FURNACE CORP.
49 River St., Buffalo 2, N. Y.

Send data on Brazing Furnaces Checked:

☐ Mesh Belt ☐ Elevator ☐ Pusher ☐ Bell

☐ Other .....

Name .....

Title .....

Company .....

Address .....

City ..... Zone ..... State .....

GIANT

IN THE MAKING

Machining a section of a 7500-ton press. This weldment weighs 83 tons. It is shown on a 14′ x 30′ planer.

The machining of this huge weldment or the building of a complete machine, large or small, is a type of work regularly performed in Sun Ship's machinery plant, where *Marine and Industrial* machinery is built.

We invite discussion of your machinery problems.

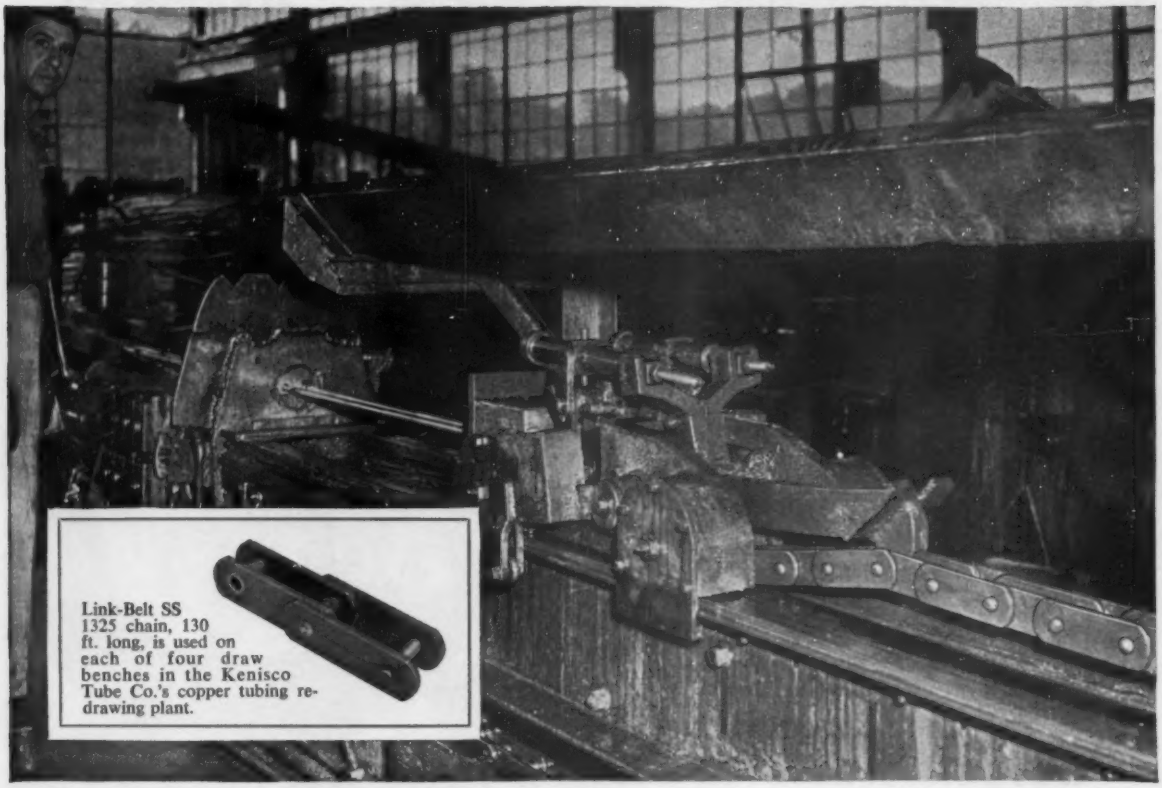
Sun

SHIPBUILDING & DRY DOCK COMPANY

SINCE 1916

ON THE DELAWARE • CHESTER, PA.

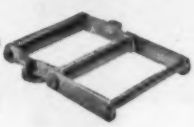
Here's why so many of the nation's draw benches use LINK-BELT chain



Link-Belt SS 1325 chain, 130 ft. long, is used on each of four draw benches in the Kenisco Tube Co.'s copper tubing re-drawing plant.

Looking for the best chain for a specific need?
LINK-BELT makes the complete line

Class H drag chain—for drag conveyors, handling shavings or other refuse in runways or troughs.



Class C combination chain—popular, durable, low-cost design for elevators, conveyors.

LXS chain—particularly suitable for heavy-duty drive and conveying jobs.

Transfer chain with tilting dogs—for plate and slab travel, loads up to 300,000 pounds.

LINK-BELT offers the chain that's best for every job

WHETHER it's for a 5000 or a 100,000-pound bench, Link-Belt draw bench chain is built to maintain close pitch and correct sprocket contact. Links are accurately machined after hardening by a special process that assures longer chain life.

Manufacturing refinements such as these are typical of every chain in the complete Link-Belt line. Accurate control of raw materials and manufacturing processes is your assurance of uniformity.

For complete information on chains and sprockets for draw bench or any drive or conveyor service, get in touch with your nearest Link-Belt office or authorized stock-carrying distributor.

LINK-BELT

CHAINS and SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.143

SUPERAY 'A' sets the standards:

Super-sensitive Ansco Film detects flaws of less than 1% of total thickness

Sensitive Ansco Superay 'A' Industrial X-ray Film can actually detect flaws of less than 1% at certain thicknesses. Super-fast, as well, it slashes seconds and minutes from exposing times at low voltages and *hours* from inspection time when using radioactive isotopes. First and still the finest all purpose film tailored to meet the demands of industrial radiography, Superay 'A' has increased its following every year since its introduction. *It's the standard by which all other industrial X-ray films are measured.*

WRITE FOR NEW ANSCO X-RAY PRODUCTS BROCHURE CONTAINING USEFUL TECHNICAL INFORMATION

America's oldest maker of photographic materials... **Ansco**

BINGHAMTON, NEW YORK

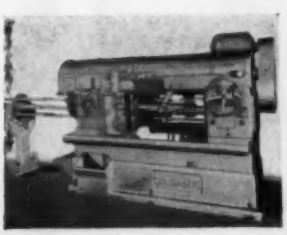
A Division of General Aniline & Film Corporation

61 models

A machine not put to its best use is theoretically idle. Proper machine selection is an important factor in the profitable use of a multiple spindle automatic. So extensive are the demands on this type of lathe that no single model—or number of models—can be expected to efficiently handle the wide range of work available.

To excel in any range of work a multiple spindle automatic must be specifically designed for that range. That is why CONOMATICS are provided in so many models. In no other way can the purchaser be assured of the best possible machine for his particular requirements.

Write for your copy Today



Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.

LEADERS IN INDUSTRIAL SAFETY: U. S. STEEL

At U. S. Steel, a thorough going safety program is *vital* to efficient production. As a part of this over-all program, fire-resistant Pydraul is used for hydraulically operated equipment located in potential danger areas.

A Tested Combination: Pydraul Hydraulic Fluid in Askania Regulators

Where it's a matter of hydraulic control of pressure, flow and ratio at U. S. Steel, you'll often find dependable Askania Regulators on the job—in blast furnaces, coke ovens, open hearths and soaking pits. Near these intense heat sources, U. S. Steel uses Pydraul to operate this and other hydraulic equipment. Here's why:

Pydraul is fire resistant . . . the only fire-resistant hydraulic fluid listed with Underwriters' Laboratories.

Pydraul gives you more than safety. You can be sure of long equipment life with low maintenance . . . because Pydraul lubricates like a premium petroleum oil. You'll save money on fluid consumption, too! Pydraul is reclaimable —you can return spillage to the system, use it again and again.

If you have any hydraulic equipment that must operate near hot metal, electrical contacts, open flame or other heat sources, you might be taking a needless risk. Your Monsanto representative will show you how easy and economical it is to convert to a fire-safe Pydraul system.

Write for a Pydraul F-9 booklet. Organic Chemicals Division, MONSANTO CHEMICAL COMPANY, Dept. PYD-4, St. Louis 1, Mo.

Pydraul F-9—first and only hydraulic fluid listed by Underwriters' Laboratories.

"In respect to fire hazard, Pydraul F-9 is rated by Underwriters' Laboratories, Inc., 2 to 3 in a class much less flammable than paraffin (petroleum) oil, according to a schedule in which Ether is rated 100; Gasoline 90—100; Alcohol (ethyl) 60—70; Kerosene 30—40; Paraffin Oil, 10—20." *Pydraul: Reg. U. S. Pat. Off.*

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MONSANTO

WHERE CREATIVE CHEMISTRY WORKS WONDERS FOR YOU

250-TON FORGINGS

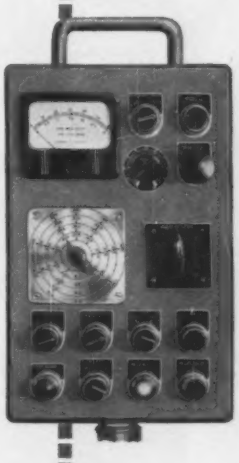
machined with finger-tip control

Handles 250-ton forgings on centers alone while spotting for steadyrests. Swings 12 feet over the ways and takes work up to 60 feet long. Turns 14-foot tapers in one setting (with special attachment). That's the kind of performance delivered by this Betts 12-foot heavy-duty lathe.

Weighing over 240 tons, it is the heaviest, most powerful general-purpose lathe in the country. And it couldn't be easier to operate. A push-button panel mounted on the carriage enables the operator to control cutting speed with his eyes on the cut. He can change speed up or down while the tool is cutting – for maximum metal removal or optimum finish. Two big dials above the faceplate guide him, one indicating RPM, the other percentage of motor load. Exact settings are achieved faster and with greater ease than ever before.

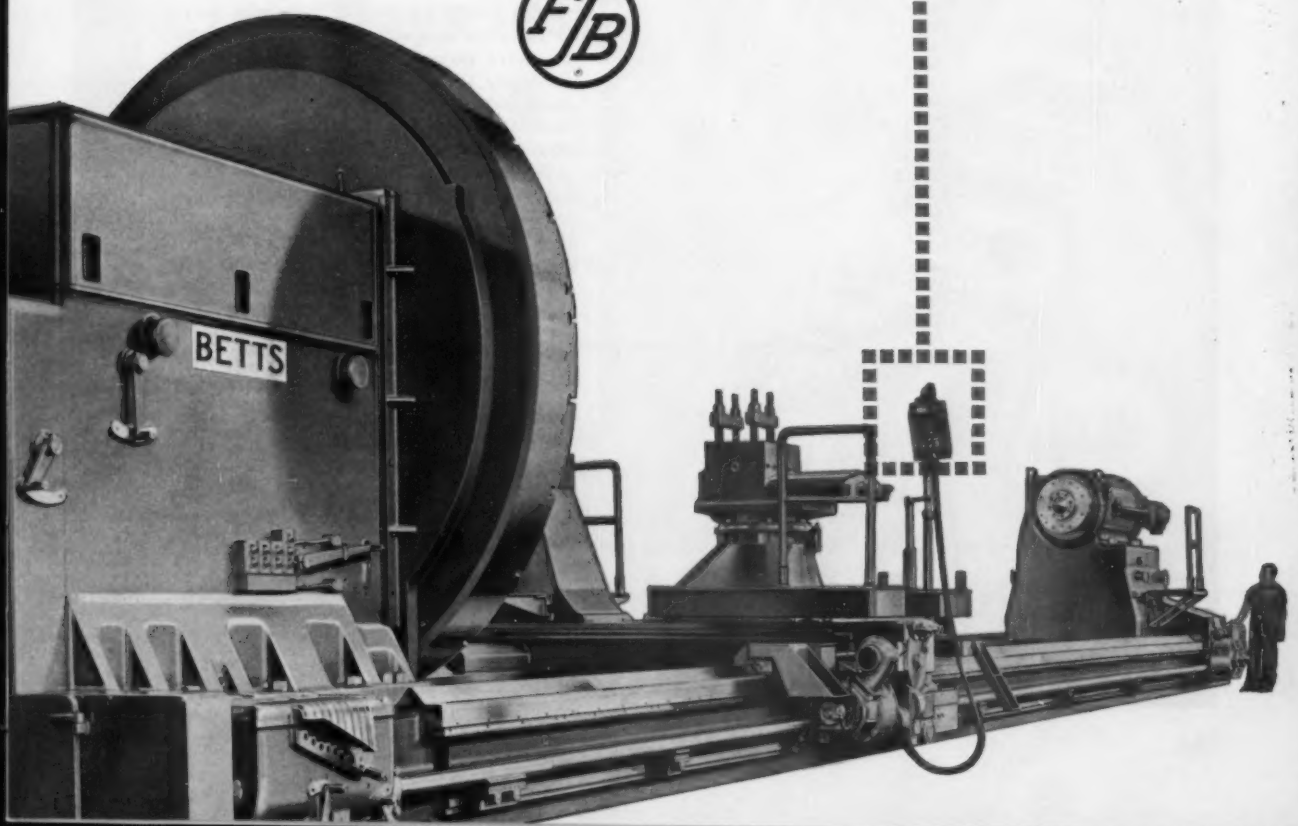
From the same panel, the operator selects feeds. Electronically controlled, they can be adjusted in fine increments. Directional power traverse of the carriage and the toolrest are also at his finger tips.

Consolidated specializes in huge, heavy-duty machine tools such as this. Why not discuss your requirements with us?

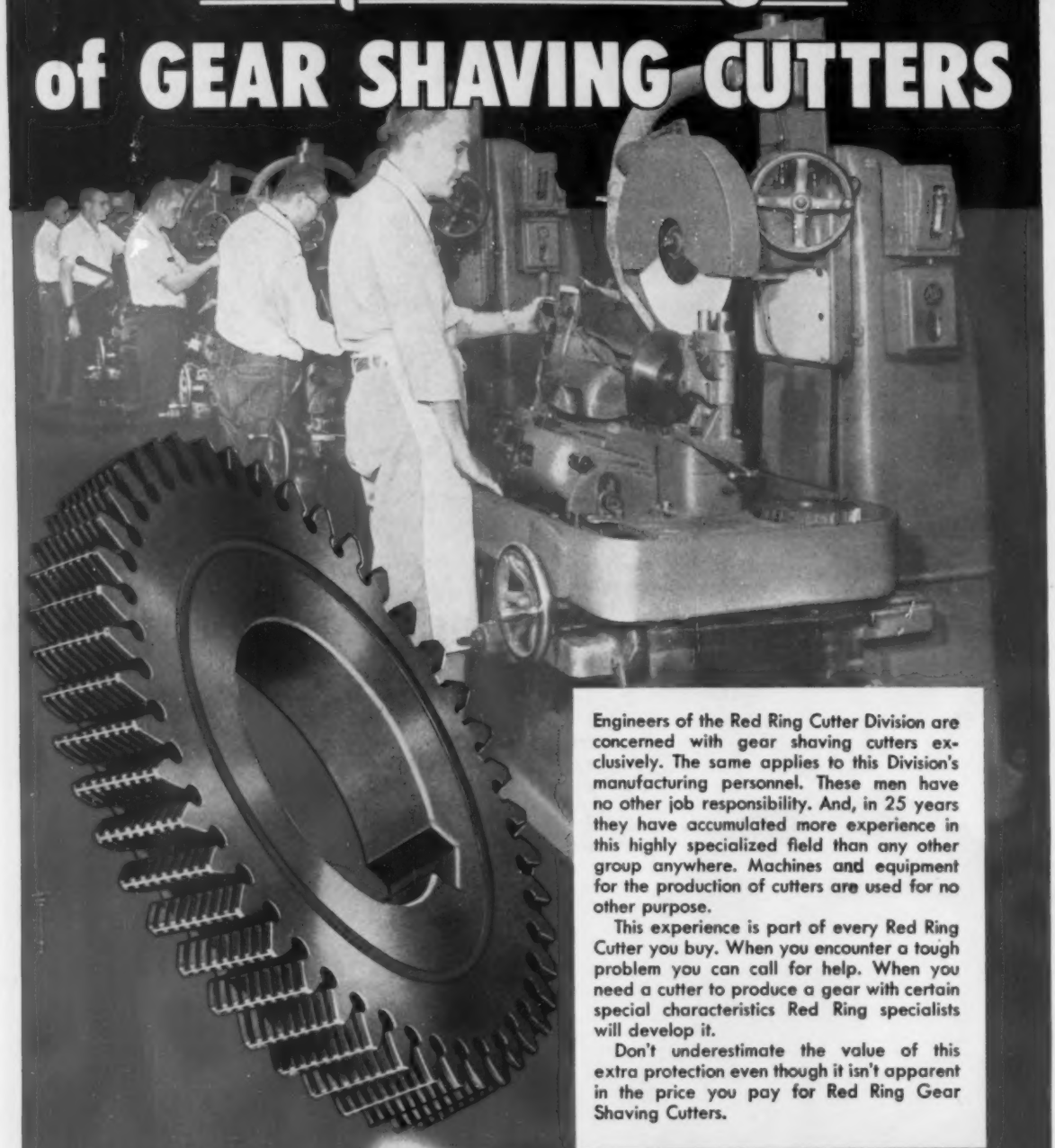


CONSOLIDATED MACHINE TOOL DIVISION
FARREL-BIRMINGHAM COMPANY, INC.
Rochester 10, N. Y.

CM-7



A Tip to the Buyer of GEAR SHAVING CUTTERS



Engineers of the Red Ring Cutter Division are concerned with gear shaving cutters exclusively. The same applies to this Division's manufacturing personnel. These men have no other job responsibility. And, in 25 years they have accumulated more experience in this highly specialized field than any other group anywhere. Machines and equipment for the production of cutters are used for no other purpose.

This experience is part of every Red Ring Cutter you buy. When you encounter a tough problem you can call for help. When you need a cutter to produce a gear with certain special characteristics Red Ring specialists will develop it.

Don't underestimate the value of this extra protection even though it isn't apparent in the price you pay for Red Ring Gear Shaving Cutters.

SPUR AND HELICAL GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING
AND ELLIPTOID TOOTH FORM

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN • DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

These two 300 pound TOCCO melting furnaces are powered by a 200 KW, 3000 cycle TOCCO motor generator set.

TOCCO* Induction Melting "Delivers"— In Two Days Instead of Two Months!

Casting backlogs at Commercial Shearing and Stamping Co. in Youngstown, Ohio used to lag from 8 to 10 weeks behind production schedules. By installing four 300 pound TOCCO melting furnaces this firm upped daily melting capacity to 16,000 pounds. Now orders can be shipped in 48 to 72 hours.

In a foundry occupying less than 5000 square feet of space, production of castings jumped between 40% and 50%; tensile strength of alloy castings was boosted from 35,000 to 50,000 p.s.i. Substantial savings in the cost of castings have resulted. Moreover, with precision casting and molding on a push-button basis, many former drilling and roughing operations were completely eliminated.

Many firms have discovered that TOCCO Induction Melting insures maximum quality control, increased volume and lower operating costs—foundry premiums directly linked to TOCCO's rapid melting, simplicity of operation, low alloy loss, constant burn off and pinpoint quality control.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. A-9, Cleveland 5, Ohio

Please send copy of "The Case for TOCCO Induction Melting."

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State____

ARCOS announces . . .

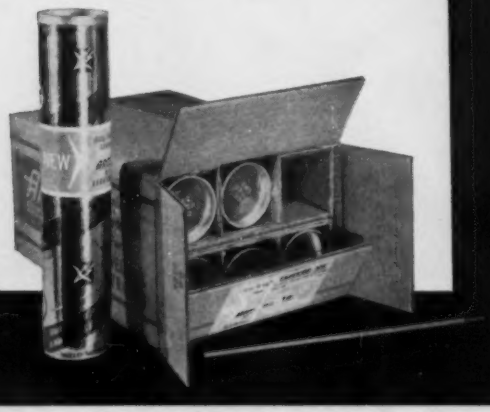
new easy-to-use DC electrodes

THE AEROCOR SERIES

Especially developed for DC reverse polarity welding of stainless sheet metal. Available in the following types: 308, 309, 310, 316, 347, 349, 410; sizes 1/16" to 1/8" dia.

THE FABRICOR SERIES

Especially developed for DC reverse polarity welding of heavy stainless. Available in the following types: 308, 309, 310, 316, 347; sizes 3/32" to 1/4".



Good news for every user of stainless electrodes

AEROCOR and FABRICOR identify America's newest DC welding electrodes.

To users they offer an opportunity for faster, easier welding. They've been especially designed for quality welds with the benefits and properties you want most.

For example, on every job, AEROCOR and FABRICOR Electrodes offer you these advantages:

- **Excellent arc action**
- **"Drag-type" welding technique**
- **Little or no spatter**
- **Superior washing action—good contours, sound penetration**
- **Smooth, even-rippled weld beads**
- **Slag that chips off quick and easy**

AEROCOR and FABRICOR are manufactured to the same high standards as all ARCOS Stainless Electrodes. And they're packaged in the famous Arcos ELECTROPAK — the easy-to-open-and-reseal container that protects against moisture pick-up and chipped coatings. Both series are identified by a bright orange colored label. Available through your Arcos representative or distributor.

FREE PERFORMANCE TEST

See the results in your own plant. Compare the performance of these new ARCOS Electrodes to what you're now using. Just drop us a line on your company letterhead and we'll arrange a demonstration. No obligation, of course.

More than ever it pays to . . . **WELD WITH** ARCOS

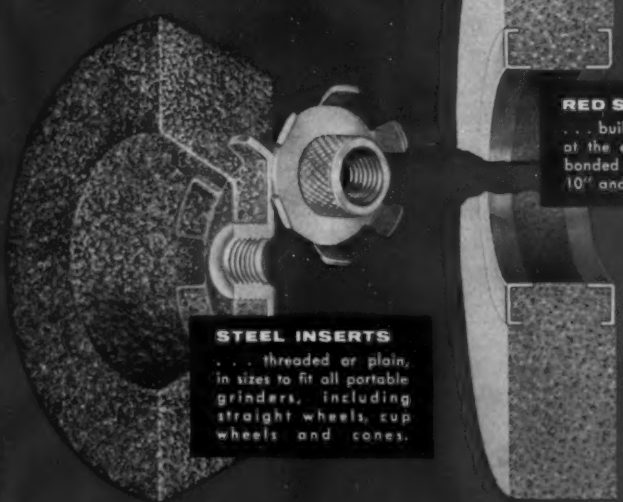
ARCOS CORPORATION • *1500 South 50th Street* • *Philadelphia 43, Pa.*

SIMONDS
ABRASIVE CO.

GRINDING WHEELS... with *improved bushings* for better grinding

TRUFIT
. . . a resin-impregnated fiber sleeve in the center hole, principally for resinoid bonded wheels for portable grinders.

POLYSTYRENE
. . . injection molded plastic material replacing conventional lead bushing, chiefly for tool room wheels such as 7" x ½" x 1¼".



RED STREAK FLANGES
. . . built-in circular steel flanges at the center hole. For resinoid bonded snagging wheels with 6", 10" and 12" hole sizes.

STEEL INSERTS
. . . threaded or plain, in sizes to fit all portable grinders, including straight wheels, cup wheels and cones.

KARVIT
. . . a hard, non-metallic material with a smooth surface, replaces lead or plain holes, principally for precision grinding wheels.

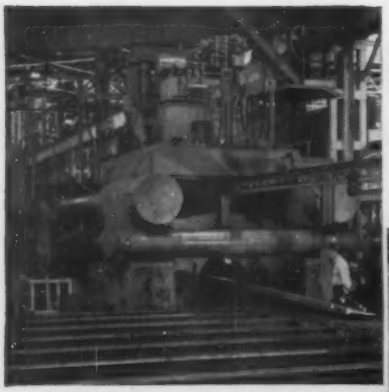
Better, more economical grinding! Simonds literally "centers" on this with these improved bushings. For you, this means better grinding efficiency . . . in terms of better spindle fit, better balance, truer running, less wear on spindles and center mounts and better work produced.

Put all these advantages to work for you by specifying Simonds Abrasive Co. Wheels on all your grinding jobs.

SIMONDS ABRASIVE COMPANY • PHILADELPHIA 37, PA.

Branch Warehouses: Boston, Detroit, Chicago, Portland, San Francisco. Distributors in Principal Cities
Division of Simonds Saw and Steel Co., Fitchburg, Mass.

For the King and Queen of Extrusion Presses . . . it's FIRTH STERLING HOT WORK DIE STEEL



Giant press extruding an aluminum spar section.

2500 lb. die blanks and a finished extrusion die of Firth Sterling HWD Hot Work Die Steel.

At Kaiser Aluminum & Chemical Corporation's Halethorpe Extrusion Works, operated under a U. S. Air Force lease, are two 8,000 ton capacity extrusion presses—the largest operating units designed and built in the United States. Presently extruding large, complex aluminum shapes—wing spars, wing panel sections, and missile hull sections, for the aircraft industry, the two giant presses, named Rex and Regina, utilize dies made from Firth Sterling Hot Work Die Steel.

Yes, Firth Sterling HWD is a monarch in its own right, with properties capable of withstanding the tremendous pressures of this king and queen of extrusion presses. This intricate process requires materials that can operate continuously in volume production without replacement. These giant presses each weigh 1500 tons and are capable of extruding aluminum shapes more than 85 feet long and over 1200 pounds each in weight. The use of Firth Sterling HWD is tangible evidence of the high opinion modern die makers have of the quality of the material.

HWD Steel is just one of the Firth Sterling line of more than 50 Tool and Die Steels. Ask for a Firth Sterling engineer to cooperate in your next die making problem to assure the correct grade and analysis.

R-326

Firth Sterling

—INC—

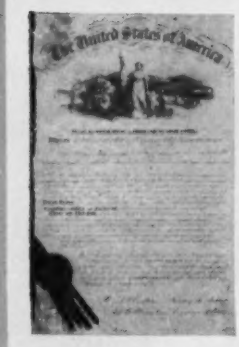
GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

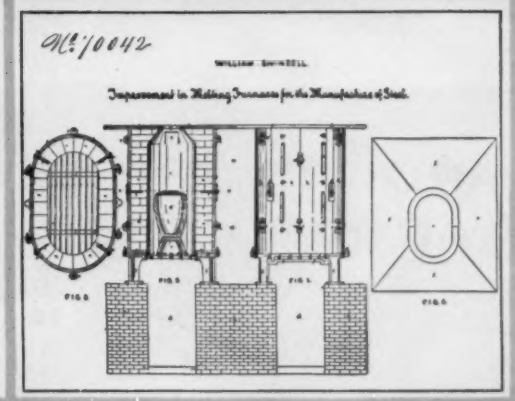
MILLS: McKEESPORT, TRAFFORD, DETROIT, HOUSTON, HARTFORD

OFFICES AND WAREHOUSES*: BIRMINGHAM CHICAGO* CLEVELAND* DAYTON DETROIT* HARTFORD* HOUSTON* LOS ANGELES* PITTSBURGH WESTFIELD, N.J.

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels
Tool & Die Steels
Stainless Specialties
High Temperature Alloys
Sintered Tungsten Carbides
Firth Heavy Metal
Chromium Carbides
High Temperature Cermets
Zirconium





An early patent (No. 70,042 U.S. Patent Office) granted to Mr. William Swindell for an improved crucible furnace, for the melting of steel.

OVER 105 YEARS
... of knowing how

Today's SWINDELL Electric Melting Furnaces, employing the most advanced construction and operating features, reflect in their performance a continuity of steel-melting knowledge and experience extending over 105 years. In fact, a very large American steel producer has been our customer for 103 years. • *Knowing how* is one of the two great qualities in SWINDELL furnace production. The other is integrity. • Let us consult with you.

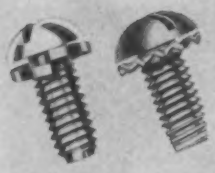
SWINDELL

ELECTRIC MELTING FURNACES

SWINDELL-DRESSLER CORP.

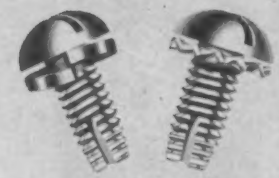
DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES

Pittsburgh, Pa.



SPRINGTITES AND SEMS

SNAP RINGS

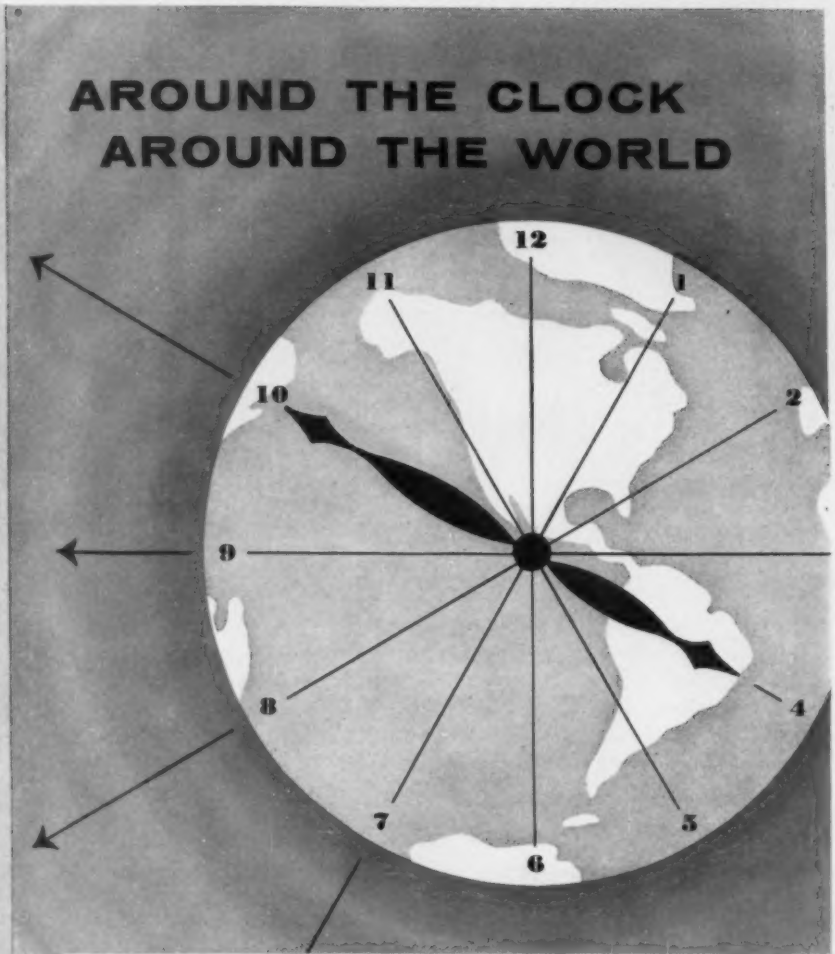


THREAD-CUTTING SPRINGTITES AND SEMS

EATON KEPS®

HOZ-FAS-NERS®

SPRING LOCK WASHERS



Eaton-Reliance Fasteners Keep Assemblies Tighter Longer

Used to advantage wherever assemblies are fastened together, Eaton-Reliance products will be found throughout industry . . . railroad, automotive, appliance, electric, heavy and light machinery, aircraft, and many others. They are manufactured of quality controlled materials to rigid specifications, and are designed to reduce assembly costs and speed up production. There's an Eaton type fastener for your particular needs. Send for free Engineering Bulletin giving details. Just name the fasteners in which you are interested.

EATON

RELIANCE DIVISION

MANUFACTURING COMPANY

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SALES OFFICES: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

compare with the standard

...in high speed steels the standard's REX

Ever since grandad's day, Crucible's REX® high speed steel has been *the standard by which all other high speed steels are compared.* And now the quality and uniformity of REX are even *better,* thanks to improved manufacturing techniques at Crucible.

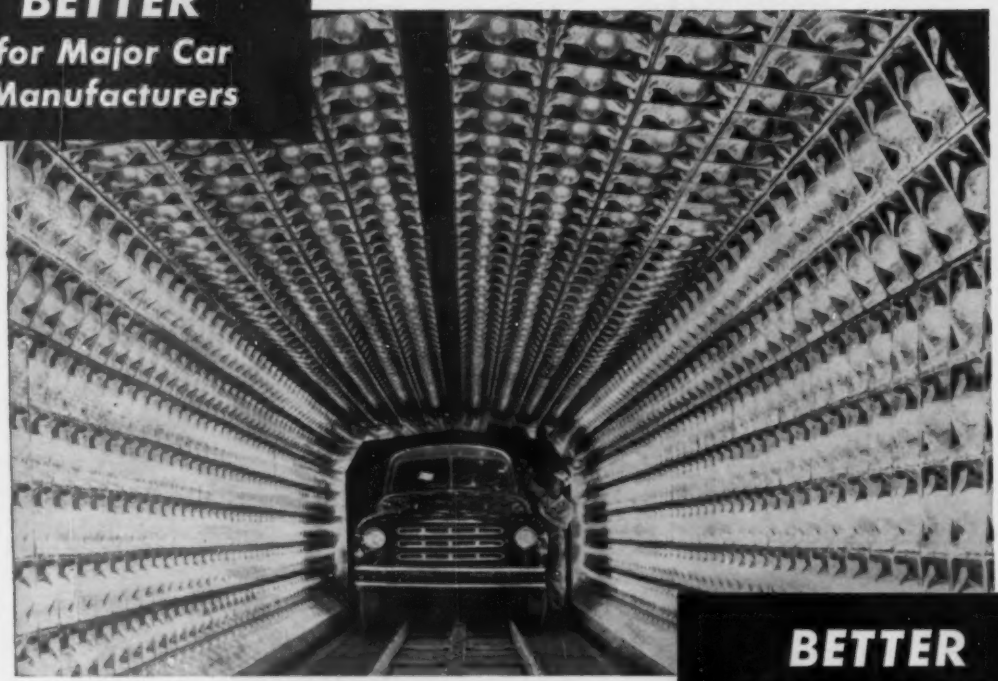
Don't take our word for it. Prove for yourself how REX leads in structure, uniformity, response to heat treatment, and fine tool performance.

Ask for REX at your nearby Crucible warehouse — or order it through prompt mill shipments. And, for a list of available data on all Crucible special purpose steels, write now for a free copy of the "Crucible Publication Catalog". *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

BETTER
for Major Car Manufacturers



Fostoria Industrial Infrared Ovens are used by every major car manufacturer in more than 300 automotive installations.

BETTER FOR YOU!

In the automotive industry

MILES OF OVENS . . . BY FOSTORIA

give top-quality results . . . *at lowest cost!*

Don't take *our* word for it—look what's been happening in the highly competitive automotive industry. Today, the customer list for FOSTORIA RADIANT OVENS reads like a "Who's Who" among automotive manufacturers. The list of FOSTORIA users includes *all* of the major car and truck manufacturers in this country. It also includes many automotive component part manufacturers and assembly plants overseas. These companies are ordering and *re-ordering* FOSTORIA Ovens . . . and have been for years! The reason behind FOSTORIA's position of leadership is clear. FOSTORIA is the world's oldest and largest manufacturer of industrial infrared ovens—with unrivalled application "know-how" and experience in engineering *all three major types* of industrial infrared equipment, from components to complete ovens—Quartz Lamp, Radiant Rod and Conventional Infrared Lamp. An experienced FOSTORIA sales engineer is ready to help *you* achieve important savings with FOSTORIA RADIANT OVENS too.

Call him today and take advantage of these specialized services. There's no obligation.

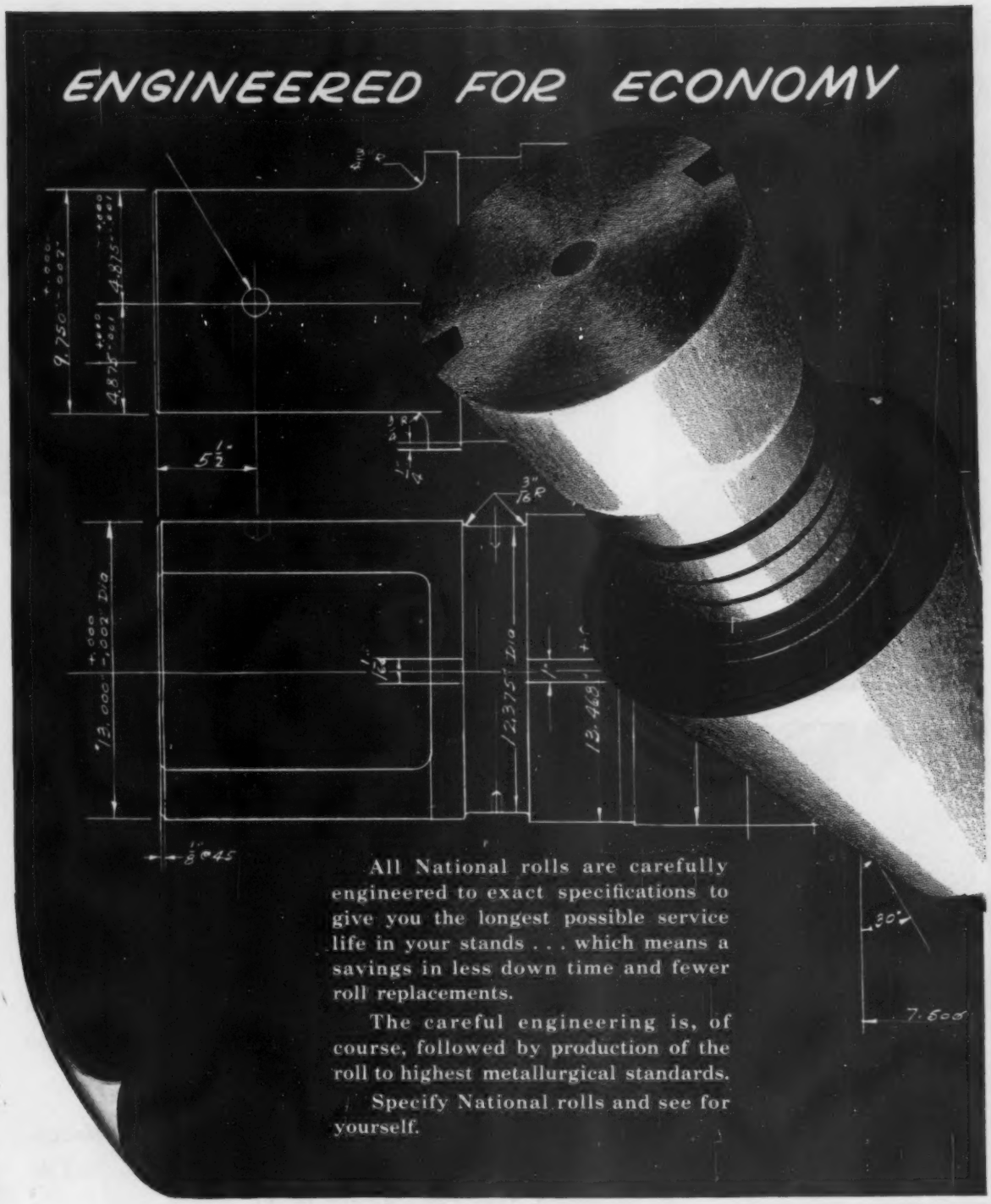
Write for a free copy of "Applications Unlimited," a fact-filled booklet of cost-saving information on Radiant heating.

INFRA-RED fostoria SYSTEM

5810

THE FOSTORIA PRESSED STEEL CORPORATION, Dept. 924, Fostoria, Ohio

ENGINEERED FOR ECONOMY



All National rolls are carefully engineered to exact specifications to give you the longest possible service life in your stands . . . which means a savings in less down time and fewer roll replacements.

The careful engineering is, of course, followed by production of the roll to highest metallurgical standards.

Specify National rolls and see for yourself.

THE NATIONAL ROLL & FOUNDRY CO.

(A Wholly Owned Subsidiary of General Steel Castings Corporation)

Avonmore (Westmoreland County) Pennsylvania

Specialists in Iron, Alloy Iron and Steel Rolls, Carbon, Alloy and Manganese Steel Castings

THE CASE OF THE

HALF FINGERPRINT...

...and what it means to you!

These three plates were synthetically fingerprinted. The one at the left was then dipped in Solvent. The center plate was half submerged in Houghton's Fingerprint Neutralizer (Rust Veto) and the plate at the right was completely immersed in the same neutralizer. After one week's exposure, rust had formed as shown on the surfaces *not* protected by Rust Veto, thus proving its ability to neutralize such prints.

That half print shows dramatically how RUST VETO protects highly finished metal from corrosion. Read the complete story at the left.

This is only one example of Houghton's rust prevention service. Since 1869, we have specialized in developing products to meet every type of rust problem.

If you have a corrosion problem, put it up to the Houghton Man—or write direct to E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

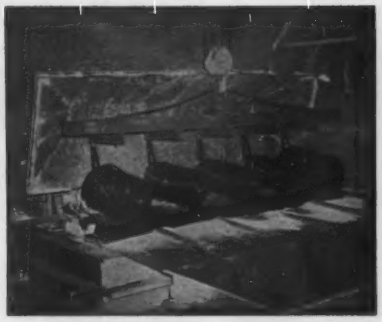
RUST VETO ...a product of

E. F. HOUGHTON & CO.

PHILADELPHIA • CHICAGO • DETROIT • SAN FRANCISCO

Ready to give you on-the-job service . . .

TITANIUM STRIP is descaled continuously on time cycles as low as 30 seconds, with excellent results.



10-MINUTE IMMERSION loosens scale on 5 tons of stainless wire. A water quench, 3-minute acid dip, and final water rinse produce a clean, bright surface with no pitting or etching.

Use this fast, safe Hooker Process for descaling steel and titanium

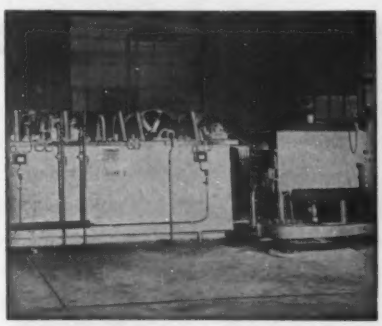
Descale alloy steels and titanium in any form—rapidly, safely—using the Hooker Process with Virgo® Descaling Salt.

A bath of molten Virgo Descaling Salt quickly converts scale, rust, and other surface impurities to an acid-soluble coating. A quench, acid dip, and final spraying then remove this coating in from one-tenth to one-hundredth the usual pickling time, with no measurable effect on the base metal.

You can easily set up the Hooker Process for batch or continuous operation on any form of work including strip, sheets, bars, wire, tubes, plate, castings, forgings, and fabricated parts. You can usually process work as fast as your handling methods allow, with a minimum of supervision. Operation is safe for personnel, and there is little or no spent-acid disposal problem.

You can profit by the experience of more than 50 companies now using the Hooker Process successfully to speed up descaling of alloy steels and titanium in practically every form.

You'll get quick service on any descaling problem, by writing or phoning us. Complete test and engineering facilities are at your disposal, without obligation.



LIGHT-GAUGE ALLOY STRIP is descaled at 20-35 ft. per min. in this Virgo bath, after annealing.

Send for these bulletins—Get the whole story on Virgo Descaling Salt for alloy steels and titanium . . . how the Hooker Process works, its advantages, how to set up a Virgo descaling line, and the services you enjoy as a user. No obligation. Write us today.

From the Salt of the Earth

HOOKER CHEMICALS

4-1088

HOOKER ELECTROCHEMICAL COMPANY

309 UNION ST., NIAGARA FALLS, N. Y.

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

Courtesy: Link-Belt Company

Ray-Man Belt "TRAINS" Naturally and Hauls Full Loads

Engineered features of Ray-Man Conveyor Belt give it the easy troughability and wear resistance to handle the heaviest loads. Special cushioned strength members and strong, yet resilient synthetic outer plies provide compensation to give this belt unusual flexibility. It permits full loads even where thick, narrow belts are used, or where belts must round small pulleys. Ray-Man Conveyor Belt requires no breaker strip . . . yet it resists gouging, tearing and ripping from large, abrasive lumps better than other constructions. It holds fasteners under the most severe operating conditions.

Ray-Man is mildew-proof and moisture resistant. Like other Manhattan heavy duty conveyor belts, it features R/M's exclusive "XDC" Cover which gives it protection against wear, tear, cuts and abrasion never before possible. We say Ray-Man Conveyor Belt gives you "More Use per Dollar" because it does a better job . . . and it *lasts longer.*

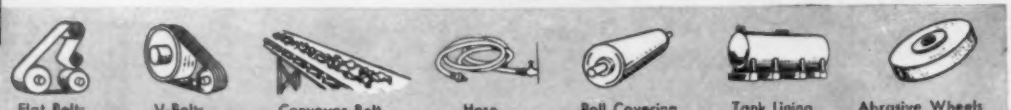
Let an R/M representative show you the advantages of Ray-Man as well as other R/M feature conveyor belts . . . extra-cushioned Homocord, for unusually abusive shock loading . . . R/M Tension-Master for extra long lifts and high tensions. For the best conveyor belt to meet your job requirements . . . for "More Use per Dollar" . . . contact an R/M representative today.

RM-502

R/M

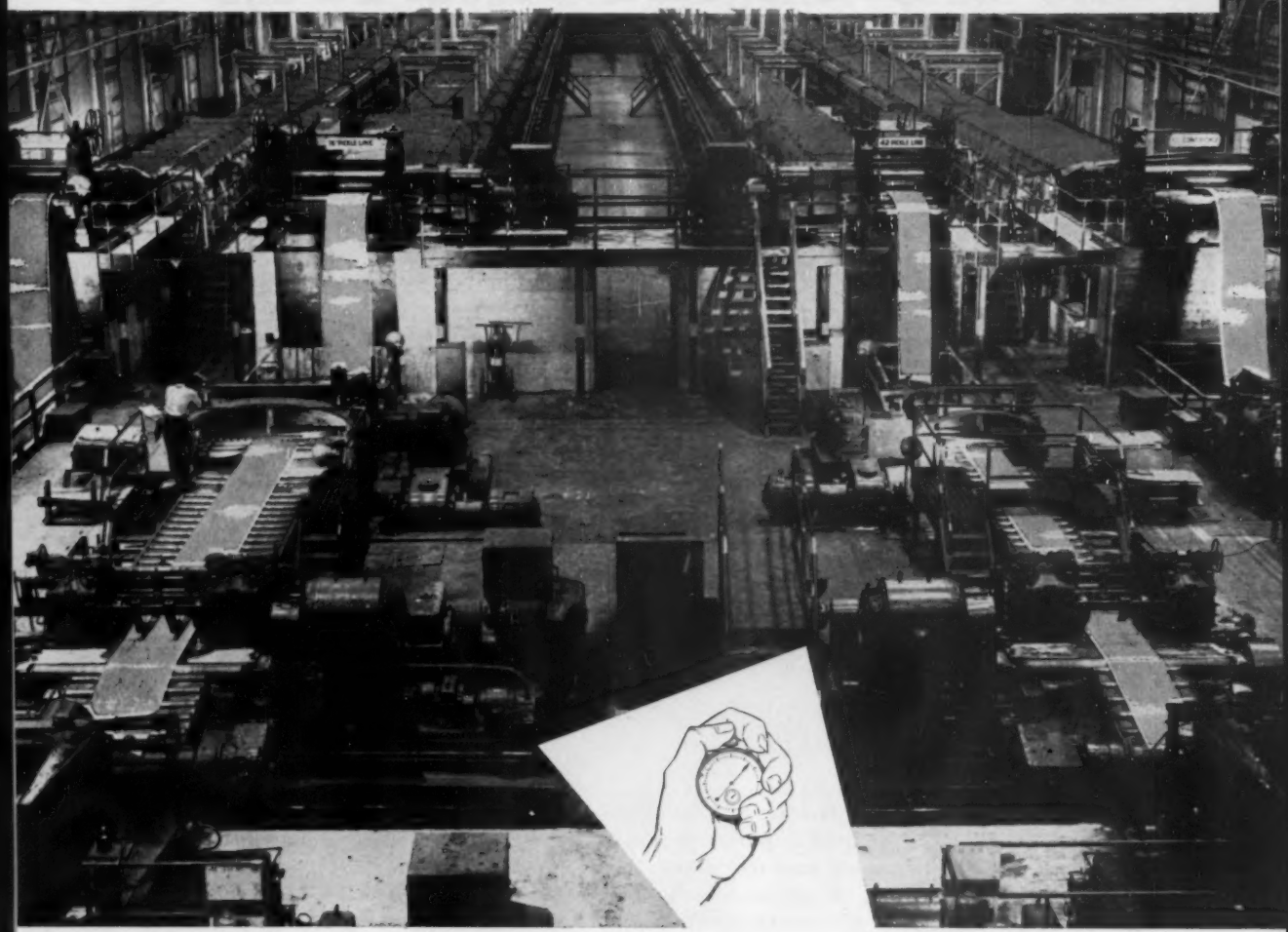
MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.



Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

From Wean Pickling Lines



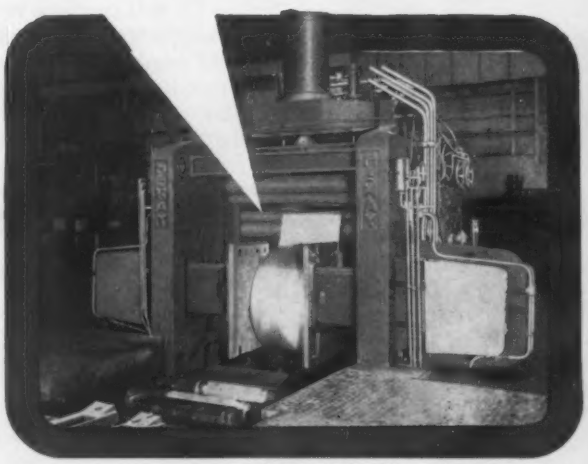
Four high production Wean Pickling Lines at work in one of the nation's largest mills.

....the finest product at record speeds

Wean Pickling Lines are setting production records wherever they are installed. BUT, more important to steel producers is the excellence of pickled product these lines are turning out—even at their fastest speeds.

Part of the story is the double breaker processing uncoiler, right, that properly prepares the strip for rapid and uniform pickling at high speeds. Wean lines are engineered to give producers installations which provide the ultimate in automation and high speed operation.

When next you're in the market for pickling equipment be certain to see a Wean line in operation. We're sure you'll be convinced Wean engineered lines are what you need.



No modern pickling line should be without a McKay Processing Uncoiler to prepare the strip for high speed pickling.

The WEAN ENGINEERING CO., INC. WARREN, OHIO

Ferrocolumbium

now...

a new source

The use of Columbium is now free of any restrictions and may be again employed as a valuable alloying material, recognized for improving high temperature properties and increasing corrosion resistance.

In announcing the addition of this product to its line of metallurgical alloying elements, the same reliable MCA technology is offered that has distinguished MCA molybdenum, tungsten, boron and rare earths . . . faithful uniformity in fulfilling specifications . . . deliveries to accurately anticipate customer's requirements.

Further, the sources of supply for the raw material are plentiful, and will continue to increase.

MCA Ferrocolumbium is available in a variety of screen sizes to meet manufacturing requirements. It will pay you to investigate this new supply source, today.

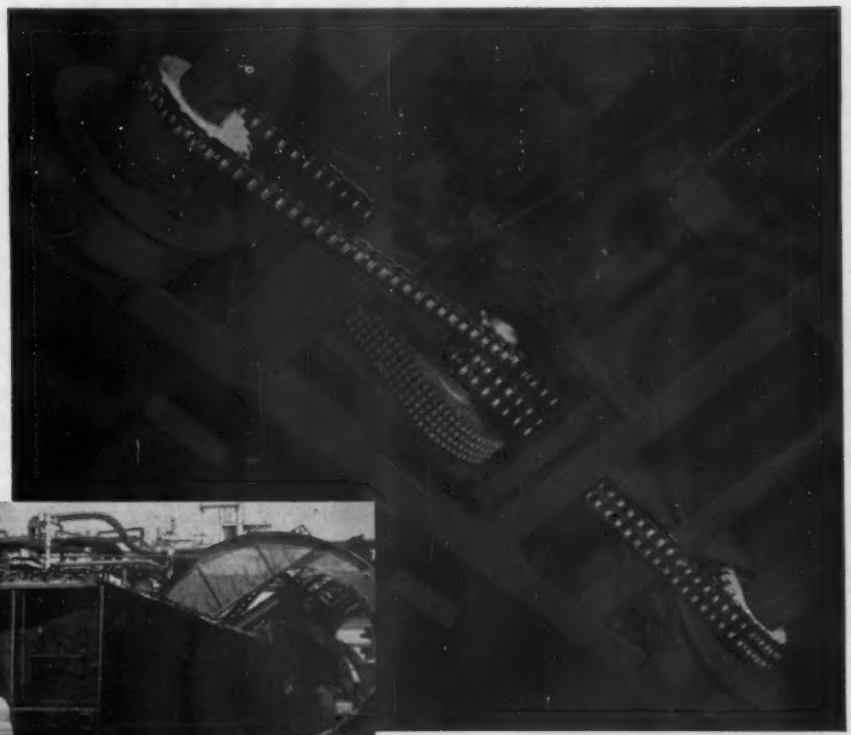
MOLYBDENUM

Grant Building CORPORATION OF AMERICA **Pittsburgh 19, Pa.**

Offices: Pittsburgh, Chicago, Los Angeles, New York, San Francisco
Sales Representatives: Brumley-Donaldson Co., Los Angeles, San Francisco
Subsidiary: Cleveland Tungsten, Inc., Cleveland
Plants: Washington, Pa., York, Pa.

Pint-size Whiting Trackmobile gets switch-engine power with Morse Roller Chain Drives

Morse Chain drives take tremendous loads, punishing operating conditions right in stride



View of Whiting Trackmobile undercarriage, showing Morse Roller Chain Drives. Employs single-, double-, and quadruple-width chain. Photo at left shows Trackmobile pushing loaded coal car to dumper. Rubber-tired wheels at ends lower to permit operation of vehicle off railroad tracks.

The Trackmobile, manufactured by the Whiting Corporation (Harvey, Illinois), does the work of a large locomotive; easily handles loads averaging 100 tons.

A major reason for the Trackmobile's rugged performance is its powerful drive system, featuring Morse Roller Chain and Sprockets. Morse quality-engineered products function perfectly under abnormal loads, and conditions such as cinders, dust, snow, ice, sand, and extremes of heat and cold.

Morse Power Transmission Products offer the utmost in efficiency, flexibility, long life, and economy of operation.

Literature, engineering help free

Call your local Morse Distributor or write today for Morse Roller Chain Catalog C 51-50. Skilled Morse engineers are ready to help you solve virtually any problem concerning power transmission equipment—Roller Chain, Hy-Vo Drives, Silent Chain, Sprockets, Clutches, and Couplings.

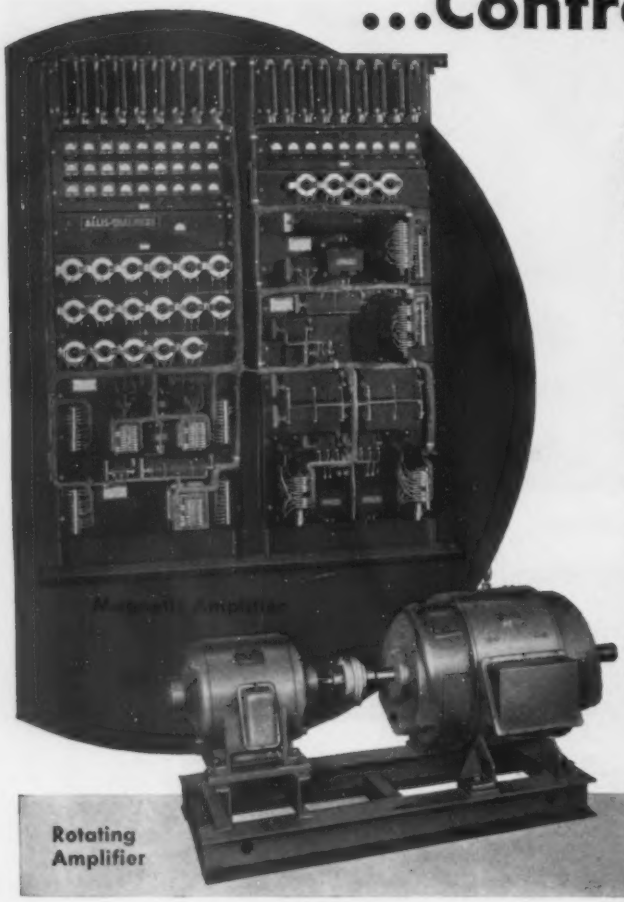
MORSE CHAIN COMPANY • A BORG-WARNER INDUSTRY • ITHACA, N. Y.

MORSE MORSE BW* **POWER TRANSMISSION PRODUCTS**

*trademark

You get **MORE** when you Specify Allis-Chalmers

...More Mill Production ...Control Over Quality



Rotating Amplifier

The most important factor in meeting the challenge of more tonnage and improved quality is effective regulation. And effective regulation is more than a matter of good regulator design. It embraces overall *system* design . . . the integration of generators, exciters, motors, regulators and other control equipment. As manufacturer of all these interdependent components, Allis-Chalmers is in a unique position to provide this practical approach to mill regulation.

"Coordineered" System

Allis-Chalmers maintains separate departments, staffed by specialists, for each product. "Coordineering" results from an interdepartment exchange of ideas and technical information correlated in *one* department specializing in metals-producing industry application. All components are matched to meet the requirements of your job. Responsibility for system performance rests with one company.

For complete information, see your Allis-Chalmers representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.

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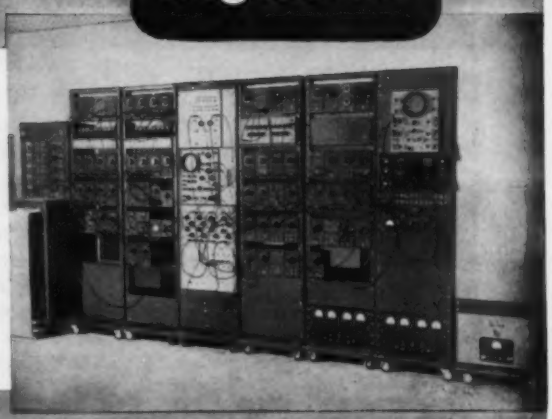
ALLIS-CHALMERS **Regulators**



Three Types of Regulators Available

The following types of regulation are "coordineered" into an Allis-Chalmers system:

1. ***Regulex* Rotating Amplifier** — Applicable where high power levels for reversible output are desired.
2. **Magnetic Amplifier** — Applicable where low power levels for reversing or high power levels for non-reversing are desired.
3. **Combinations of *Regulex* Rotating and Magnetic Amplifiers** — Each complements the other for maximum efficiency.

Analytical Facilities Utilized . . .

System performance is simulated in the computers to get optimum configuration of components. The constants and exciter ceilings necessary for desired response are established.

Regulex is an Allis-Chalmers trademark.

ALLIS-CHALMERS

NEWSFRONT

Missiles Strengthen Navy's Hand

Exponents of the Give-the-Navy-a-greater-role-in-guided-missiles argument are taking a strong new tack. Their reasoning: More than half the world's population—with its industrial support—is within 50 miles of the sea. A sea-launched, 1700-mile-range missile could home in on almost any conceivable target. Air Force's Snark has already flown to 2000-mile range.

Don't Write Off Heavy Plate's Chances

Heavy plate, one of three steel products for which renewed tax amortization is under intensive government review, may be due for a boom. Defense officials are setting up to mobilize a huge tanker fleet to haul oil around Africa if the Suez negotiations break down (and officials see the odds as 6 to 4 or better that they will). Eventuality would bolster chances for plate tax relief.

Atomic Aircraft: Progress Encouraging

Application of atomic energy to aircraft may be closer than many think. Though considered a hopeless idea a few years ago, AEC now has four reactors (11 more are planned) working on the problem. It has already ground-tested a military turbojet engine under nuclear power; reports "encouraging but not conclusive" results.

Shaping Up: Lower Shell-Molding Costs

Clay-bearing, subangular bank sands costing about ⅔ less than today's shell-molding sands may drop costs of steel shell-molded castings. Also, mold mix additives under investigation promise higher hot-mold strength than today's phenol-formaldehyde resin binders produce. Some may provide high mold strength even beyond present resin combustion temperatures.

Oxygen Converters Win New Adherents

Oxygen converters for steelmaking are gaining ground in the mills. Kaiser Steel's installation of a top blown converter will make the third of this type in the U. S. At least one other producer is asking fabricators for bids on a project said to employ a converter of somewhat different design.

Appliances: A Brighter Note

Despite increasing reports from the East of declines in appliance sales levels and rising manufacturer inventories of heavy appliances, the situation is far from general. Some concerns — and several major producers among them—report they're exceeding their own very optimistic sales forecasts made early this year.

Simulator For Ultrasonic Inspection

Qualitative and quantitative effects, size and shape of internal defects commonly found in large turbine and generator rotor forgings are graphically portrayed by a new ultrasonic inspection simulator. The G-E built unit utilizes a transparent, glycerine-filled disk to represent particular sections of a steel rotor forging seen by a test crystal at any given instant. The inexpensive device simplifies inspector training.

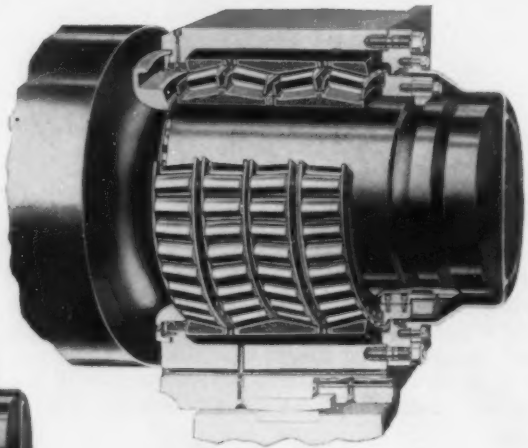
Republicans: Best Hope for T-H Amendment

Strange as it seems, Capital labor experts believe there's a better chance of amendment of the Taft-Hartley Act if Republicans control Congress. Reason: Eisenhower Republicans will follow Ike's recommendations to amend with support from northern Democrats. In Democratic-controlled sessions, southern Democrats and Republican conservatives have combined to prevent effective action.

Welding Speeds Push 6000 IPM

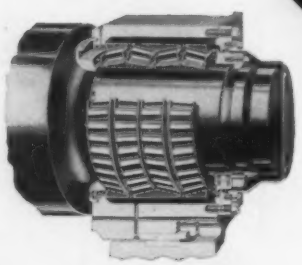
Eyebrows raised earlier this year, when an announcement of a patent on an inert-gas-shielded welding process claimed speeds of "at least 1000 ipm." They're apt to slip up several notches further soon. Though the process is still being kept under wraps for further development, it's now reported that speeds of close to 6000 ipm are being attained on sheet metal applications.

TIMKEN® bearings used on rolling mill roll necks



1956

561 mills



1950

317 mills

1933

45 mills

Look how this idea has grown in 23 years!

JUST 23 years ago—in 1933—there were 45 mills using Timken bearing-equipped stands. Today, 1354 Timken bearing-equipped stands are used in 561 mills . . . more than eleven times as many mills as in 1933.

Why has the idea of using Timken® tapered roller bearings on mill roll necks become so widely adopted? For all these reasons:

1. LOW BEARING COST. Tonnage records indicate that the long life of Timken roll neck bearings keeps bearing cost per ton of steel rolled to a minimum.

2. GREATER MILL RIGIDITY. Balanced proportion design of Timken bearings permits larger roll necks than ever before possible with tapered roller bearings.

3. ELIMINATION OF COMPLICATED LUBRICATING SYSTEMS. Timken bearings permit use of simple grease lubrication.

4. LOAD RATINGS INCREASED UP TO 40% due to Timken bearings' balanced proportion design.

5. NO SPECIAL THRUST BEARINGS NEEDED. Timken tapered roller bearings take both radial and thrust loads.

6. MILLS CAN BE STOPPED AND RESTARTED WITH NO LOSS OF STEEL. Timken bearings permit starting under full load.

7. HIGHER ROLLING MILL SPEEDS are possible because Timken bearings minimize friction.

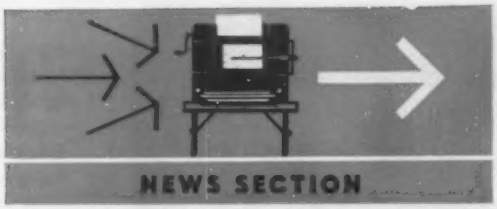
8. PROLONGED ROLL LIFE is assured because Timken bearings provide maximum roll neck strength, less wear.

You can be sure of all these advantages in either existing or new equipment by specifying Timken tapered roller bearings for back-up and work rolls. Consult our roll neck bearing specialists for full details. Write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: TIMROSCO".

See us at the **NATIONAL METALS EXPOSITION**
October 8-12, Public Auditorium, Cleveland, Ohio
BOOTH 1051

TIMKEN TAPERED ROLLER BEARINGS ROLL THE LOAD

TRADE-MARK REG. U. S. PAT. OFF.



Cleveland Sets Fast Metalworking Pace

The city's highly diversified plants boast some of the most unique industrial equipment in the nation . . . St. Lawrence Seaway will double the area's $5 billion output . . . Ore shipping center—By *T. M. Rohan.*

◆ OUT OF the 35,000 metalworkers expected to pour into Cleveland in another week for the Metals Show, there'll be hardly a one who can't find a plant there in the same kind of business — probably a healthy competitor. As a matter of fact, competitors will probably be the easiest thing to find.

WITHIN a 500-mile radius of Cleveland lie 64 pct of U. S. manufacturing plants; nearly 55 pct of U. S. and Canadian population; 74 pct of American payroll dollars.

It is truly a city of workers, engineers and builders with metalworking in wide diversity topping the list. Over two-thirds of all types of manufactured industrial products are made in Cleveland, according to classifications of the Department of Commerce. Some of the most unique industrial equipment like cold forming mills, elaborate heat treating furnaces, some of the largest industrial cranes are built at this Lake Erie port.

Since 1950 Ford has built no less than five plants in Cleveland, including its most highly automated engine plant, making it Ford's top city outside Detroit. General Motors is the biggest employer, with Thompson Products a close second.

Phenomenal Growth

The statistics tell part of the story. Industrial output last year was $5 billion. Plant expansion in the last 10 years has been $2 billion. Last year alone there were 90 new plants started up with a $21.4 million annual payroll of 4312 employees. In 10 years there have been 1207 new plants with 43,016 employees.

Expansion of older firms has been even greater. Last year they hit 729 at a cost of $291.5 million. Industrial capacity of the area is about 3 pct of the U. S. total and is expected to hit 5 or 6 pct when the St. Lawrence seaway gets into operation. The biggest single category is transportation equipment, principally auto and airplane parts.

The predominance of heavy industry is everywhere evident around Cleveland. One clear indication to even a casual visitor is the huge ore boats sitting low in the harbor water, heavy with ore from Minnesota. Through a tortuous series of bends in the Cuyahoga River they are pushed and pulled by tugs to docks of Republic, Jones & Laughlin, U. S. Steel and to railroads. They are unloaded in as little as six hours by huge Hulett unloaders reaching down into holds like a bird pecking grain and bringing up 16 tons per peck.

In the "flats" hugging the Cuya-

hoga are concentrated the oldest of basic industries: the steel mills, chemical plants, coal, sand and gravel docks and petroleum refineries. On the outskirts of town are ultra-modern plants which could do justice to a country club. Most are kept spotlessly clean, inside and out, and have football field-size parking lots.

Among Cleveland's engineering wonders are:

U. S. Steel Corp.

- **Largest merchant iron furnace.**
- **Widest continuous sheet rolling mill.**
- **Largest and fastest rod mill.**
- **Largest nut and bolt plant under one roof.**
- **Largest pipe plant (at neighboring Lorain).**
- **Largest aluminum forging plant.**
- **Iron ore capital.**
- **Top metalworking association town.**
- **Home base of third largest steel firm.**
- **Second largest machine tool center.**

Top Capacities

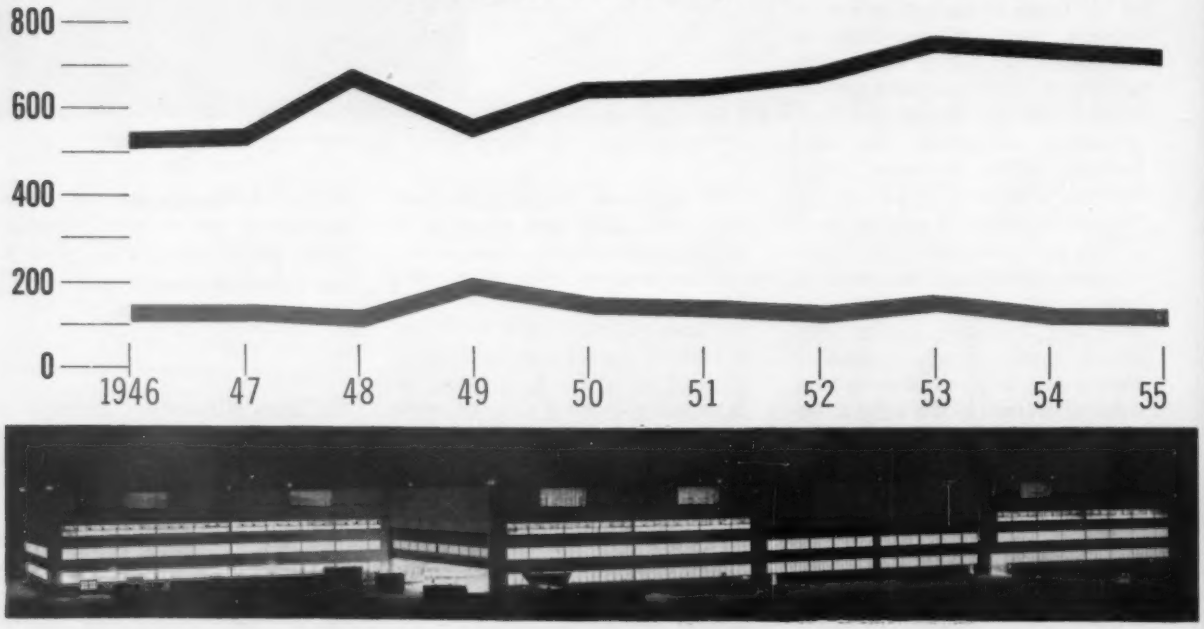
The largest merchant iron furnace operated by American Steel and Wire Div. of U. S. Steel was blown in two years ago. Rated 1350 tons per day it supplies over 200 Northern Ohio and Michigan foundries. Republic Steel's 98 in. wide sheet rolling mill was installed in the late 30s principally to meet demand from auto makers for wide sheet for turret top automobiles. Second place goes to a 96 in. unit.

American Steel & Wire Div.'s Cuyahoga Works' 450,000 ton per year rod mill was put in production this year. It is the fastest and largest in the world, taking a 3¼ in. square billet down to 0.218 in. (No. 5) wire continuously without reheating. It is operating at 6000 fpm while the next two fastest ones in the United States operate at 5400.

Republic Steel's nut and bolt plant in the "flats" is the largest under one roof. The National Tube Div. mill at Lorain, Ohio, is the largest pipe plant in the U. S. turning out seamless and welded pipe and tubing.

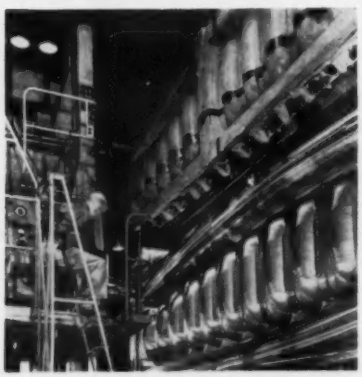
The Hall process for reduction of aluminum from ore was developed in a garage at Oberlin near Cleveland and the lineal descendant, Alcoa, is represented in Cleveland with the largest aluminum forging plant in the country. Showpieces of this plant are 50,000 and 35,000 ton capacity Air Force forging presses.

Cleveland: It's Putting On More Industrial Muscle



A new England plant has identical rated presses making the two neck-and-neck but the Cleveland plant has more smaller preses. It also has one of the largest tool and die shops to make monster dies for the Air Force presses and recently turned out the largest known closed die forging.

The "Forest City" is also the acknowledged capital of the iron ore trade, both for the Mesabi and in far flung corners of the world. About 85 pct of the Great Lakes tonnage shipping is di-



Alcoa

rected from Cleveland by the top-ranking iron ore firms. Their main foothold is the Lake Superior district still supplying three quarters of all U. S. iron ore. But in far-off Oregon a nickel mine is being operated by Cleveland's M. A. Hanna Co. and Republic Steel brings openhearth lump ore in from Liberia to Cleveland. Republic, third largest U. S. producer, has its home base and largest mill in Cleveland. The town ranks second only to Cincinnati as a machine tool producer.

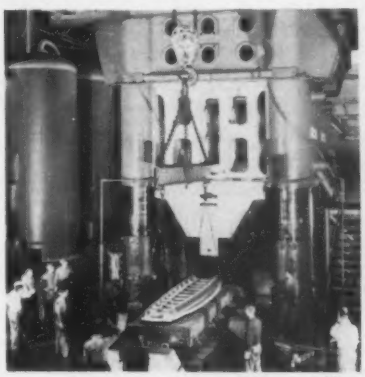
The parts business, that of making something for somebody else's machine, is the major segment of Cleveland metalworking. In the automobile industry, for example, Cleveland turns out more parts than any city in the U. S. except Detroit. Yet there are no complete cars assembled in Cleveland so it is rarely recognized as an auto production center.

In airplanes, too, it is the largest supply center for jet engine parts. In a year it turns out 25 pct of all parts and accessories used by U. S. Aircraft manufacturers. Yet there is not a proprietary airplane or even completed engine made in town, a situation similar to automotive.

Lures New Industry

Engineeringwise, this means a high degree of specialization in squeezing the last bit of performance out of a piece of metal or the last bit of production out of a whole plant. And this Cleveland does, competing on equal terms in the most highly competitive industries.

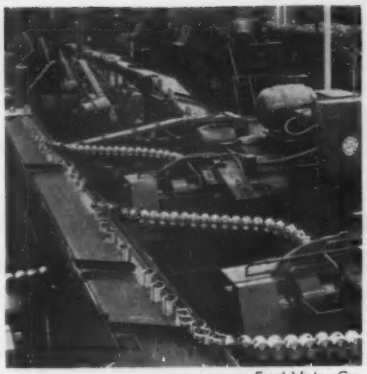
Most towns can put up a pretty good set of statistics on why new plants should be put there. In Cleveland, the Cleveland Electric Illuminating Co. carries the ball with the Chamber of Commerce and is probably as well known nationally for pushing the slogan "Best Location in the Nation" than it is for electricity. The campaign started after World War II.



Alcoa

Basis for the "best location" is that within a 500 mile radius of Cleveland are:

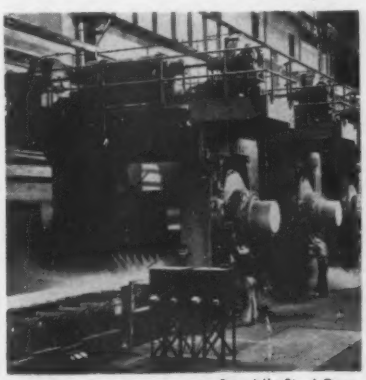
54.5 pct of United States and Canadian total population.
63.7 pct of United States manufacturing plants.
67.5 pct of United States products in dollars.
74 pct manufacturing payroll dollars.
57 pct retail sales.
62 pct wholesale sales.



Ford Motor Co.

Trade Group Center

Thus, as logistics center roughly halfway between New York and Chicago, astride 5 major railroads, an 800-mile system of turnpikes, 150 truck lines and 11 airlines, Cleveland figures to be first in line when the St. Lawrence seaway comes through in 1959. Coal from southern Ohio, West Virginia, and Pennsylvania is an overnight haul away; and iron ore from Minnesota and Labrador lands at the city's waterfront.



Republic Steel Corp.

Trade association secretaries have their own chapter almost completely dominated by national metalworking groups. To name a few are the gray and malleable steel founders, two steel warehouse groups, stamping firms, machine tool builders, tool and die makers, iron ore and lake carriers association and American Society for Metals.

Reprints: Individual copies of this article are available as long as the supply lasts. Write Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

HEALTH

NOISE: How To Win Over Factory Din

Concern over damaged worker hearing mounts . . . Sound programs pay off in improved health and morale as well as fewer damage claims . . . Periodic checks of hearing are necessary to noise program—By G. G. Carr.

◆ AN OUNCE OF PREVENTION is still worth a pound of cure. And it's truer than ever in industrial noise prevention programs. By using modern medical discoveries and techniques, alert management can make a big contribution to worker health, safeguard itself against liability claims, and obtain lower compensation insurance rates.

These are the conclusions of medical, engineering and insurance experts at an occupation noise conference sponsored jointly by Yale University and Liberty Mutual Insurance Co.

Damage Suits Mount

It's emphasized that there is a growing trend to consider loss of hearing an occupational disability when a worker is employed in noisy work areas. This view has already opened the door to an estimated $2 billion in damage suits.

According to Dr. Meyer Fox, chief, ear, nose and throat dept., Mt. Sinai Hospital, Milwaukee, clinical studies and wide industrial experience suggests that your plant workers will show an average hearing loss of 28 pct. And 28 pct has already been established in some areas as more than enough to qualify a worker as partially disabled —and entitled to compensation.

Establish a Program

But no matter how noisy your plant is, hearing loss is often due to other causes. Fortunately, there are positive steps that you can take to protect your company, and at the same time give real protection to your workers.

A sound program is in two parts: regular employee hearing examinations and a continuing noise suppression program in your plant. Hearing examinations are easiest (and cheapest) phase of the program, but a little thought can pay big dividends in noise suppression too.

Hearing examinations should be done as a regular part of the preplacement physical, at the end of a 60 or 90-day probationary period and at regular intervals of about a year thereafter.

A proper hearing examination should yield a permanent record of worker's hearing (in decibels) at different frequencies. The record should include age, sex, type of work and pertinent medical data (previous hearing history, ear injuries and treatments, childhood diseases and the like.)

Heart of the record, the hearing level at various frequencies, can be obtained through a machine known as a pure-tone audiometer. You don't need to invest in elaborate diagnostic machine; doctors say that any well-calibrated, portable audiometer is adequate for in-plant checks.

Expert Advice

Medical personnel are not necessary to administer the tests. Medical schools provide two-day courses in hearing testing for laymen. But medical supervision is a must. Records should be reviewed by a physician, and corrective action taken when necessary.

But without a noise suppression program, best testing will only provide a record of hearing loss. Analysis of your hearing tests will show what departments have the greatest hearing loss. Next step is a critical evaluation of possible sources of harmful noise in those departments.

Use of a decibal meter for survey purpose can be very valuable. But noise must be further analyzed into frequency bands to make the data meaningful. Proper noise evaluation and control is a job for the experts. If not on your own

How To Cut Your Plant Noise Problem

- **Schedule hearing examinations for all employees—at preplacement physical examination, at the end of the probationary period, and at regular intervals throughout employment.**
- **Establish permanent employee hearing record. This should include a record of his hearing in decibels at different frequencies. Records should include data such as sex, type of work, previous hearing history, childhood diseases etc.**
- **Provide for medical supervision and interpretation of hearing records. Assure that corrective action is taken when necessary.**
- **Establish noise suppression program. Hearing tests will show what departments have greatest hearing loss. Next step is critical evaluation of sources of harmful noise.**
- **Set program in motion, with technical assistance if necessary, to abate noise causing hearing loss.**

staff, trained personnel are available from insurance companies and state agencies. And there are private consulting firms to handle the whole job where necessary.

But remember that noise suppression can only be done effectively after proper identification of the harmful components of the overall sound. Best control is, of course, at the source. Second best is control along the path of noise transmission, and third is protection of the man himself.

Practical Suggestions

By all means, supply ear plugs for workers in noisy locations, but, warns Allen Cudworth, Liberty Mutual acoustical engineer, don't leave it at that. Ear plugs can do a fine job at filtering out those frequencies which reach the hearing mechanism through the air canal from outer to middle ear. But many frequencies are conducted by the skull and bones of the body.

For control at the source, acoustical engineers recommend building it in wherever possible. Air ejectors are a common noise source on punch presses, for example. Use mechanical ejectors if feasible. Small mufflers can be fitted to air tools. Chutes, hoppers, tumbling barrels and the like can be lined with noise deadening material where needed. The sandwich principle can be used effectively if hard use would damage the insulation too quickly.

Get Workers' Help

Keeping stock rigid in machine tools can be a major improvement. Special lined stock tubes are available for automatic screw machines. Acoustical engineers have many tricks up their sleeves, can often achieve substantial results with little fuss or cost.

A final caution by experts: Be prepared to carry out a worker education program. You can expect resistance at first. But plants have found resistance changes to support when aims and effects of the program become apparent.

And you will have the added satisfaction of making a real contribution to worker health and efficiency while taking a sound business precaution.

EXPANSION

TAX-AM: Heads For Cabinet

Issue of fast-tax for steel expansion will be put up to President Eisenhower and Cabinet . . . Defense Board sidesteps issue . . . Applications total $1.3 billion.

◆ A HOT Cabinet fight is in prospect over the issue of whether steel companies should be granted fast tax writeoffs on its multi-billion-dollar expansion programs. Applications for Certificates of Necessity covering $1.3 billion in expansion spending already are in the hopper.

The ball was tossed to President Eisenhower and his Cabinet after the powerful Defense Mobilization Board sidestepped the issue by failing to reach a decision. Arthur S. Flemming, director of the Office of Defense Mobilization, says he will put the matter up to the Cabinet at the first opportunity.

When it gets there, the problem will come in for a lot of tugging and hauling. Treasury Secretary George Humphrey is dead set against reopening steel expansion goals for tax amortization purposes unless other industries are given equal treatment. He feels steel should not be made a special case.

How It Started

Fast action either way is not likely. Chances are a decision will be delayed until after the election on the ground that whatever is done about it might be misconstrued politically.

The matter of rapid amortization for steel expansion was revived when Jones & Laughlin Steel Corp. asked for Certificates of Necessity to cover a proposed Texas pipe mill. Other mills quickly got into the act—just in case—and requests for tax amortization have passed $1.3 billion.

Two Cabinet members, Secretary Humphrey and Commerce Secretary Weeks, were at the meeting of the Defense Mobilization Board —an advisory committee of top-level officials from various agencies— at which it was decided to take the steel industry tax amortization "to the summit."

Mobilization officials withheld comment on whether any serious disagreement broke out in the meeting, but Humphrey, and to some extent Weeks, are believed to oppose use of tax amortization in peacetime except in critical cases, whereas ODM is believed to lean toward a renewal of at least some of the steel expansion goals.

The Outlook

There is a possibility that the President and his Cabinet will return the question to the DMB, setting only a general policy guide under which DMB and ODM must measure the need for renewed tax amortization in steel and other industries. Or it is possible that the Cabinet, using information collected over the past few months by the government, will approve or disapprove the request.

The total of steel industry requests for tax amortization passed $1.3 billion when Armco Steel Corp. asked for aid in building $136 million worth of facilities at Ashland, Ky., and McLouth Steel Corp. asked amortization for $199 million in facilities at Detroit.

Converter Contract

Kaiser Engineers, Division of Henry J. Kaiser Co., has awarded a contract for fabrication of the third installation of top blown oxygen steel converters in this country to Pennsylvania Engineering Corp., New Castle, Pa.

The job involves two 65-ton capacity oxygen steel vessels, stands, tilting drives and auxiliaries.

Finished units will be shipped to Kaiser Steel Corp., Fontana, Calif. Before shipment they will be fitted up in Pennsylvania Engineering's shop.

LABOR

STEEL LABOR: White Collars Are Next

United Steelworkers plans drive to organize clerical and technical workers . . . Also aims to demand shorter work week . . . Eighth constitutional convention votes pay rise for McDonald . . . Boosts dues—By *R. R. Kay.*

◆ WITH PLENTY of time on its hands, the CIO-AFL United Steelworkers of America will keep busy during the next three years by:

(1) Pushing hard to organize the unorganized clerical and technical workers.

(2) Trying to develop arguments for a shorter work week.

(3) Shaping up demands for better pensions, insurance, and supplemental unemployment benefit plans.

At least, that's how David J. McDonald, union president, sees it. And he's the boss.

They're Riding High

With a three-year contract neatly tucked away in its vault, USW's eighth constitutional convention in Los Angeles was in a gala mood. And why not? The 30,000 delegates called their new contract the "greatest victory" ever achieved by the steel union in its 20-year history.

Where does USW go from here? Although the union can't reopen its contract for three years, it doesn't plan to sit on its hands.

Next in line: a "white collar" drive to unionize the clerical and technical workers in steel, aluminum, and allied industries. Only 40,000 of the 125,000 within the union's jurisdiction are now in the fold. The pitch will be: look what we got for the production and maintenance workers—a hike from 66 cents per hour to an average $2.65 per hour since 1937.

The Prize

The number of production and maintenance workers in the basic steel industry has grown only 8.4 pct since 1937. At the same time office and technical workers have jumped by 91.2 pct—from 55,000 to 105,000, the union reports. A recent USW survey shows one large modern eastern plant with 18 pct of its employees in the clerical and technical group. "There's a great future for us here," Mr. McDonald says.

Steel expansion is going ahead at the rate of 15 million tons of increased capacity in the next three years. (See THE IRON AGE, Sept. 20, 1956.) The USW sees a big hike in number of jobs for "white collar" workers to man the industry's new automated equipment.

Automation is very much in the minds of the union leaders. But they're not afraid of it, they say. Properly used, it can bring benefits to all. And they fully expect to get a fair share. They feel they must come up with a plan to provide "fewer hours of work per week for our members and use the machine to give people more leisure and more happiness."

Secretary-treasurer I. W. Abel reported the union's worth on June 30 was $21,359,502—up $4,340,170 from two years ago. And he thinks it should be $50,000,000.

President McDonald's salary was upped from $40,000 to $50,000 per year. The vice-president and the secretary-treasurer also got hikes, from $25,000 to $35,000.

One discordant note: After much booing, hissing, and catcalling, in a close vote, the delegates approved an increase in dues from $3 to $5 per month.

Mr. McDonald strongly defended his mutual trusteeship philosophy of labor and industry. Then why the June 30 strike that tied up 85 pct of steel capacity? The answer is simple, he says. "Under any system men have the right to strike . . . under the mutual trusteeship it was necessary, in 1956, for the labor trustees in the great American steel industry to call to task the management trustees and force them, through the strike, to live up to their mutual trusteeship."

"Steel Labor" On White Collar Workers

▪ Indicative of the United Steelworkers' growing emphasis on unionization of white collar in steel and metal fabricating is a two-page spread devoted to details of the latest contract covering such workers in the special Convention issue of "Steel Labor", union magazine.

▪ The article points out that the white collar group in steel "has been growing by leaps and bounds in the last decade and now makes up at least 12 pct of the total work force in the industry", compared with "only 1 pct of total employment in steel" 50 years ago.

▪ "Steel Labor" says that about 170 companies now operate under USW contracts which cover office and technical workers, "and many other firms deal with white collar locals under special sections" in production and maintenance agreements.

MARKETING

CANS: Preserve Healthy Sales Level

Industry could top by 10 pct its mark of $1.5 billion in sales for last year . . . Non-food packers are biggest customers; food is second . . . New product developments include tinless cans, aluminum containers.

◆ THE CAN INDUSTRY continues to rack up healthy gains. Sales for the industry were about $1.5 billion last year, could easily be 10 pct over that by the end of 1956.

According to the 1954 Census of Manufactures, the "Tin Cans and Other Tinware Industry" employed 55,200 workers in 1954 compared with 46,800 in 1947, an increase of 18 pct. Establishments grew from 215 to 227. Value of products shipped increased from $678.9 million to nearly $1.4 billion.

Packers Are Factor

While there are about 210 manufacturers of tin cans in the country, many make only for their own packing operations. American Can and Continental Can last year accounted for about 80 pct of all sales. And relative shares of the market will probably remain fairly stable.

Non-food uses continue to dominate the field, accounting for about 40.7 billion cans last year. Food packing took almost 27.8 billion cans. About 8.5 billion cans went to beer which quenched thirsts in the same period, and the nation's cats and dogs consumed almost 1.7 billion cans of pet food.

Soft Drinks Want More

Soft drinks, one of the brightest gleams in canners' eyes, used 344 million cans last year. This year they should account for about 450 million tins, and it could reach 550 million in '57. The can industry foresees the day when soft drinks will be as big a market as beer, which has been increasing at a rate of about 10 pct per year, will use about 8 billion cans in 1956.

Container industry in 1955 accounted for 4,516,162 tons of tin and terneplate, according to American Iron and Steel Institute. Overwhelming majority of this steel was used by the can industry, with most of it (3,923,489 tons) electrolytic tinplate. Consumption this year should be significantly higher. Bureau of Census reports that at half-year the industry shipped 2,143,419 tons of steel in the form of cans, against 1,954,563 tons for the same period last year.

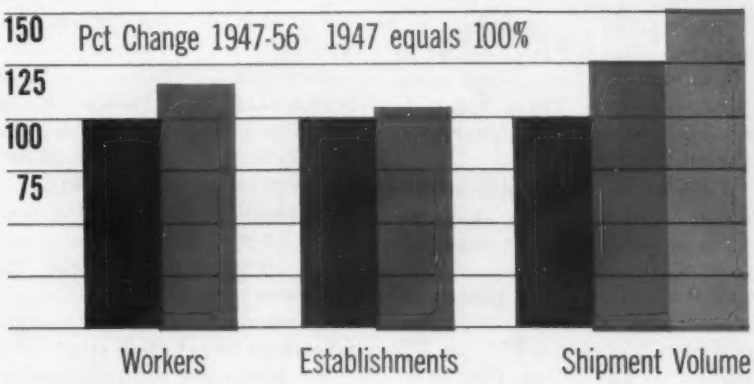
What's New?

Meanwhile, can makers have several new tricks up their sleeves, are pushing research in all directions. Fierce competition gives the can industry a cloak and dagger atmosphere almost unique in metalworking when it comes to product development. But a few gleanings can be picked up.

Perhaps the biggest push is on the tinless tin can. Vinyl coatings seem to have the lead here, although virtually all metals including copper are being studied as possible replacements for tin in one application or another. Biggest hold-up to date has been development of a can-making machine which can weld sideseams as fast as tin-coated cans can be soldered.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Stepped-Up Can Manufacture



Source: 1954 Census of Manufacturers

Shipments based on '47 dollars

MARKETING

BUSINESS: It Will Be Even Better In '57

Executives at National Industrial Conference predict an even bigger year for industry in 1957 . . . Management reticent to look past next 6 months . . . But optimism prevails for entire year.

◆ IF YOU think 1956 is turning out to be a pretty good year, wait until 1957. That's the consensus of industry leaders in steel machinery and equipment, construction, petroleum, nonferrous metals, chemicals and food, as expressed in the wind-up session on sales outlook at National Industrial Conference Board's marketing conference in New York.

Steel still points the way. Howard V. Clark, executive vice president, Detroit Steel Corp., predicted '57 steel output of about 119 million tons, an operating rate of 90 pct—"give or take 1 or 2 pct." Mr. Clark based his predictions on a personal survey of steel's top customers. He cautions that most of the brass he checked is leery of predicting beyond six months. But he feels forecasts within that period are accurate within 4 pct. His predictions for 1957 are based on the six-month estimates.

Appliances—Total sales should show a small increase over 1956, thanks to large housing starts, introduction of color options, new emphasis on kitchens in homes. Steel consumption should run slightly over this year to about 2.3 million tons.

Automotive—Mr. Clark predicts new car sales for calendar '57 at 6.5 million and trucks and buses at 1.15 million. These increases spell proportionately higher steel use by the industry.

Construction — Housing to run 1.1 to 1.2 million units, about the same as '56, with corresponding steel sales. Other private construction, including industrial, commercial and utility, will hit a new record of $16 billion in '57, against $15.4 billion this year. Public construction, for highways and educational facilities, should reach $15 billion, or 10 pct over this year. Highway program alone will use an extra one million tons of steel next year, if the metal is available.

Containers — Despite continued severe competition from nonmetallic packages, tin and blackplate consumption should be substantially up in '57, perhaps to seven million tons. Steel barrels, drums and related items may take as much as 2.5 million tons additional.

Exports — About four million tons of semifinished and finished steel should be sold offshore next year, despite prices higher than European and Japanese mills.

Machinery Industries (Including Electrical)—New orders will boost steel use about 2.5 pct, to over eight million tons.

Farm Equipment—Higher material costs may bring higher prices, but a recovering industry should use 4-5 pct more steel in '57.

Gas and Oil Drilling—Will continue to set new records. Increased demand plus present shortage of oil country goods should bring steel shipments to about 8 pct over 1955, last year for which detailed figures are available.

Railroads — Construction and maintenance steel needs should rise about 10 pct. Car builders should turn out at least 75,000 cars against 65,000 this year.

Shipbuilding — New ship construction will be up about 20 pct with corresponding increase in steel use.

Warehouses — Will continue to take about 20 pct of all steel.

Machinery and equipment sales prospects bear out Mr. Clark, according to Irwin T. White, sales manager, Gradall Div., The Warner & Swasey Co. Overall, this industrial heartland should up sales about 6 pct next year. Mr. White breaks it down:

Machine Tools—Sales zoom 20 pct, but high backlog will hold shipments to a 5-10 pct increase.

Construction Equipment—Overall sales spurt of 20-25 pct, with the federal road program accounting for at least 15 pct.

Textile Machinery—This industry is ready for replacement of old equipment, but mergers—meaning fewer customers—will hold sales to a 5-8 pct rise.

Farm Equipment—Higher farm income and replacements should mean a 10 pct sales rise in machinery for this market.

Petroleum will continue to live up to its name of black gold in '57, reports Herbert Willetts, vice-president and director in charge of domestic marketing, Socony Mobil Oil Co. Prices will probably be higher virtually across the board. And the industry will spend $6 billion plus on domestic capital investment alone.

Construction will net new records next year, forecasts Wade Hildinger, vice president, sales, National Gypsum Co. Mr. Hildinger predicts:

Highways and privately-owned public utilities will run over $5.5 billion. Utilities will show biggest jumps in railroads, wire communications, gas plant and electric generating facilities construction.

Industrial Plant Expansion — May reach $3.5 billion against estimated $3 billion this year.

Commercial Building — Up 10 pct by dollar value.

Housing—To run 1.1 to 1.2 billion new homes.

SHEETS: Too Short to Cover Schedules?

Storm signals are up for both hot and cold rolled sheet in the fourth quarter . . . Some customers already asked how much of a cutback they can stand . . . Warehouses little help—By K. W. Bennett.

• STEEL BUYERS are watching cold-rolled sheet supply for fourth quarter 1956 with growing apprehension. While few are out drumming up fresh sources of cold-rolled sheet, some are rechecking their projected production schedules against the amount of cold-rolled sheet in their plant inventory.

The warning straws in the wind aren't widespread yet, but they exist. For instance: contract hot-rolled sheet customers have been questioned as to their willingness to cut allotments slightly to allow mill suppliers to meet other customers' growing calls for cold-rolled sheet. And some mills have gone so far as to advise hot-rolled consumers there will be none available after fourth quarter.

The bulge in demand for cold-rolled sheets is aggravating an already-tough situation for hot-rolled consumers. Over the years, hot-rolled has accounted for a steadily-decreasing percentage of total sheet consumption (see chart). And when cold-rolled demand tightens, producers tend to move away from hot-rolled orders to the point where some mills have on occasion virtually stopped producing hot-rolled for sale.

Inventories

A sprinkling of the small jobbers and job slitters who were reported "loaded" with sheet stock back in May and June are beginning to seek additional tonnages of cold-rolled sheet stock for resale in fourth quarter.

Warehouse stocks of sheet and coil, a comfortable bumper in times of steel scarcity, aren't quite so strong as was generally believed back in May and June. One distributor, for example, went into the steel strike with a four months' stock. He's now down to about two months and will suffer reduced mill allotments in December and November.

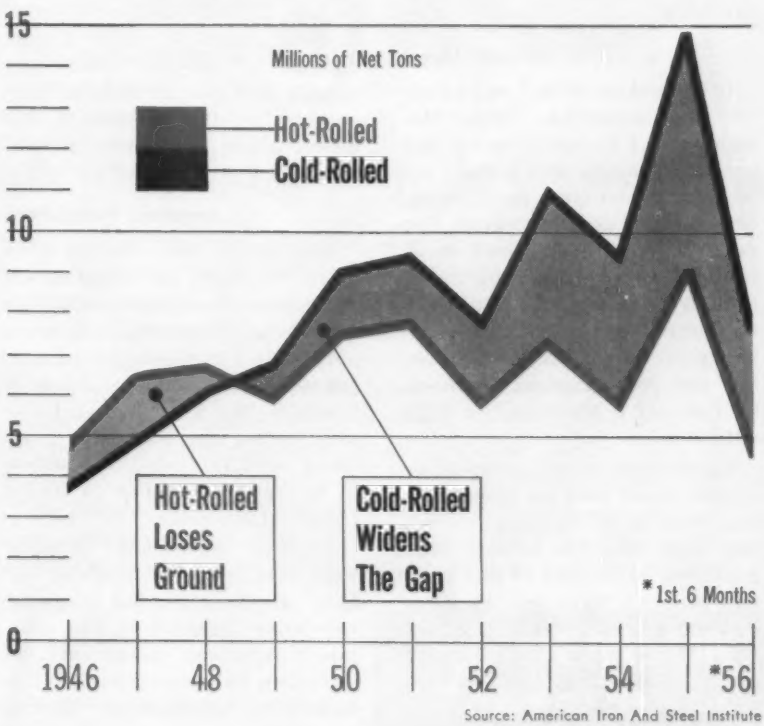
The warehouse industry generally, as reported by the American Steel Warehouse Association, went into the strike with about four months' stock of carbon sheet and strip. This is far from a heavy inventory, particularly in view of the current strong level of business in most metalworking industries.

Stampers who admit to having loaded inventory shelves, also admit that by far the greater percentage of this material is covered by orders for stampings already on the books. Additional business will require additional steel.

Though many mills reportedly haven't received firm commitments from the auto industry as to fourth quarter demands, the fact is that where such contracts have been firmly let, they are whoppers. One cold-rolled sheet rolling mill has 90 pct of its fourth quarter output tied up in automotive contracts.

At the moment, most cold-rolled sheet consumers are worried about late November and December supplies. They are quietly getting ready for trouble ahead.

Carbon Sheets: How Use Trend Reversed



Source: American Iron And Steel Institute

MANUFACTURING

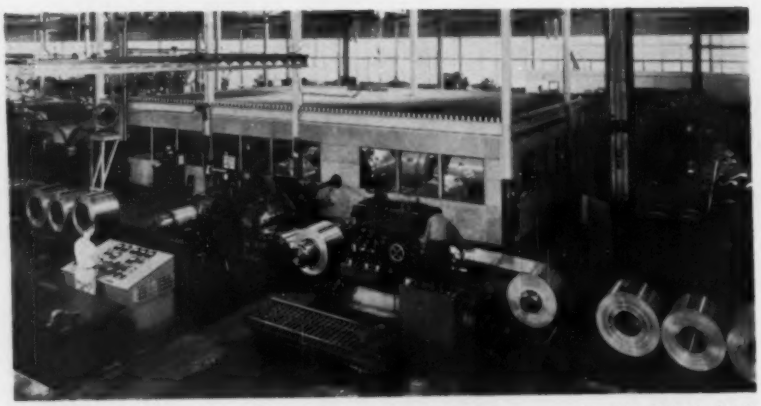
MILLS: Steelmaking Improvements Ahead

Steel's expansion plans have mill builders loaded with big order backlogs . . . Mills themselves plan improvements in steelmaking . . . Automation gets push in rush to make more steel at less cost—*By G. J. McManus.*

◆ HARD-PRESSED steel users may get some long range comfort from the plans of steel equipment makers. Their expansion plans, which they are pushing to the limit, mean added rolling capacity for future markets.

Mesta Machine Co. says operations at its recently acquired New Castle, Pa., works are rapidly moving into high gear. The present work force of 200 men is expected to be increased to more than 1000 within a year.

The New Castle plant was purchased from the government with a full complement of heavy machining equipment. Two of its four openhearth furnaces are about ready to pour casting steel. Trained workers from the 2000 that manned the works prior to its shutdown are said to be readily available.



A GOOD EXAMPLE of improved steel mill equipment, this Sendzimir high speed rolling mill is turning out thin gage copper alloy sheet for Chase Brass & Copper Co. With it, excellent surface finishes are possible.

Moving Ahead

Other makers of mill equipment are also expanding. United Machinery and Foundry, which had operated the New Castle plant under government lease for 13 years, began an $8 million program last year. New openhearth, new molding and new heat treating facilities have been included in a build-up that has increased United's capacity by 60 pct. Blaw-Knox Co. late last year acquired Continental Foundry & Machine in a $12.4 million move.

Significance of this activity lies in the urgent need for added rolling capacity to translate 15 million ingot tons into finished steel products. In the face of this need, mill suppliers have seen backlogs growing and deliveries lengthening. Mesta went into the year with backlog of $90 million and hasn't been able to reduce the figure. Blaw-Knox has a $140 million backlog (includes all products). United Engineering has an order backlog of $117 million. In terms of steel expansion, these figures add up to delivery dates that stretch well over 12 months. Any cut new facilities can make in this delay will be good news to steel users.

Improve Production

Also on the plus side for steel users, the mills are stepping up their drive for faster production techniques. Kaiser Steel Corp. is putting in two top-blown oxygen converters at Fontana. Jones & Laughlin has a similar installation due for operation next year. Other steel producers are known to be quietly working on major oxygen applications.

Another significant development was recently revealed by J&L. A new reversing roughing mill being installed at the company's Aliquippa works will be controlled by pre-punch cards. A product of Westinghouse Electric Corp., the card control cranks in a schedule of screw-down and edge settings for successive roughing passes. To change the reduction steps, the operator just inserts a different card. Pre-set controls are not new but the standard type calls for manual adjustment of a slide board.

Kaiser Aluminum is reported to be installing the Westinghouse control on a heavy mill at Ravenwood. A somewhat similar control is under development at General Electric for possible use at U. S. Steel's South (Chicago) Works. On a plate mill at its Geneva works, U. S. Steel employs an E. M. & Co. template control.

Commenting on these and other developments, J&L president C. L. Austin says the industry is on the verge of technical breakthrough that will revolutionize the making of steel. He spoke at the 60th Anniversary Dinner of The Wellman Engineering Co., in Cleveland. However, there doesn't seem to be any radical change in the pattern of steel expansion.

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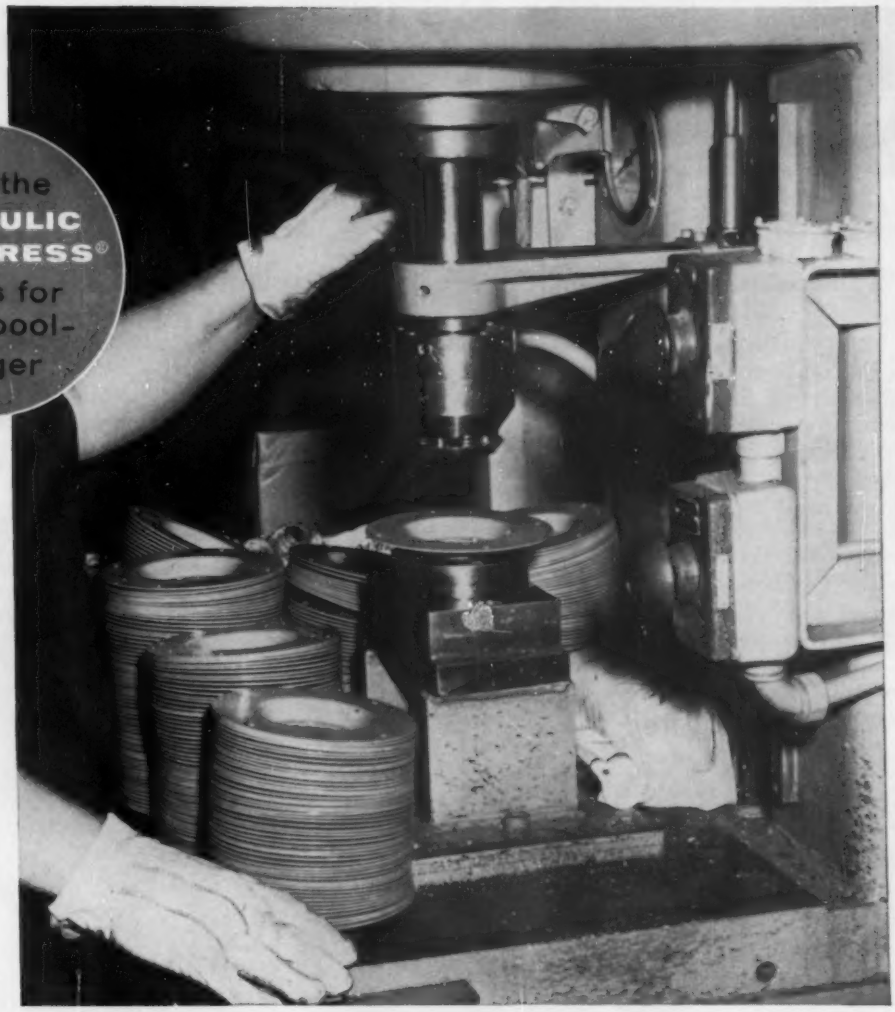

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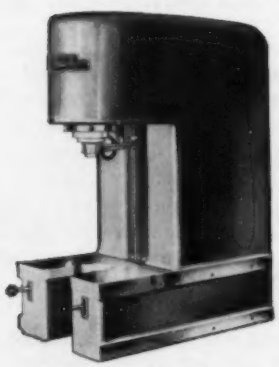

8-ton Denison hydraulic Multipress

All automatic washers, made at the rate of several thousand per day by Whirlpool-Seeger Corporation, require a stamped steel brake disc.

Rivets assemble the stamped discs to flanged hubs die cast in zinc alloy. The two parts are positioned together, rivets passed through small holes in the bottom of the stamping, projecting inside the dished portion of the disc. The four rivets are then upset, fastening the brake disc permanently to the hub.

With the 8-ton Denison hydraulic Multipress, the riveting operations are performed with perfect uniformity. Smooth, controlled hydraulic action of the ram avoids a sharp blow, yet applies the proper pressure to the rivets.

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EXPANSION IN INDUSTRY

Sylvania Tungsten

Tungsten and Chemical Div., Sylvania Electric Products, Inc., Towanda, Pa., has begun work on a new engineering and pilot production building, scheduled for completion by mid-1957.

The three-story, 48,000 sq ft structure will house the engineering offices, laboratories and pilot plant for more than 100 scientists, engineers and technicians.

It is aimed at meeting the requirements of the division's expanding activity in semiconductors, phosphors, chemicals and metallurgy.

Expansion Briefs

Hewitt & Faust Manufacturing Co., El Cajon, Calif.; supplier of specialized tooling and jig components; addition of 8000 sq ft to main plant, construction of a new building adjacent to the main plant.

Wolverine Tube Div., Calumet & Hecla, Inc.; will expand Decatur, Ala., plant to increase production capacity by 40 pct.

Minnesota Mining & Manufacturing Co., will add 15,000 sq ft of floor space to its Guin, Ala., plant for producing reflective sheet; cost about $250,000.

Pacific Scientific Aeroproducts; manufacturers of aircraft accessories and instruments; will build new headquarters and production facilities on 10 acres in Anaheim, Calif.

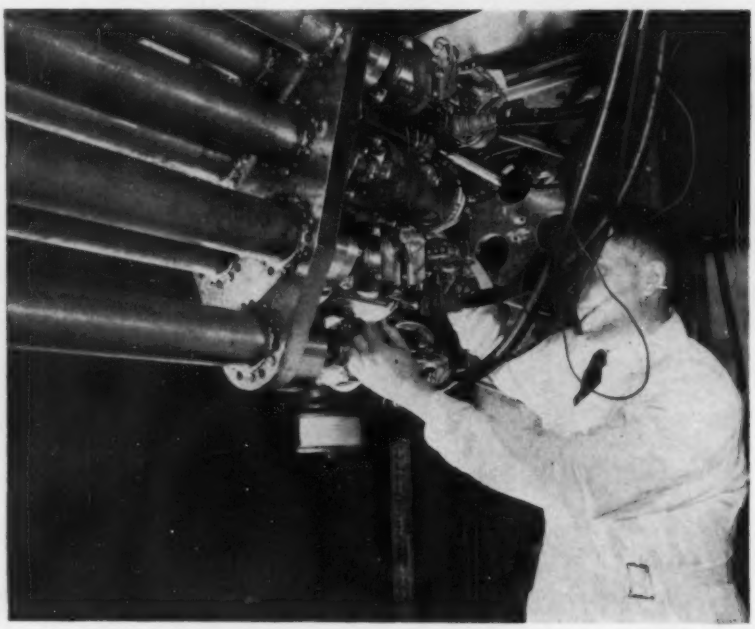
Sawhill Tubular Products, Inc., Sharon, Pa.; will add to and improve pipe manufacturing facilities; 50,000 sq ft more buildings to be added, new finishing, testing and handling facilities; cost about $3.5 million.

Industry to Capital

Washington, D. C., whose chief industry has traditionally been government, is an expanding manufacturing area with considerable growth possibilities, according to a report of the Council for Economic and Industry Research, Inc., for the National Capital Planning Commission.

The present level of industrialization now represents only about 15 pct of the maximum, the research group says. With the expansion of government slowing down—it will expand only about 18 pct in the next 25 years, the researchers figure—the area is ripe for increased industrial growth.

According to the researchers, there are some 70 industries, mostly the so-called "light" industries, which on the basis of mass market and locational factors can profitably locate in the Washington area.



FINAL CHECK is made on control drive at Alco Products nuclear reactor.

Atoms:

Alco builds one of first private labs.

One of the first privately-owned nuclear laboratories of the type in the country has been set up by Alco Products, in Schenectady, N. Y.

The nuclear criticality facility will be used to perform reactor studies aimed at checking calculations against actual performance.

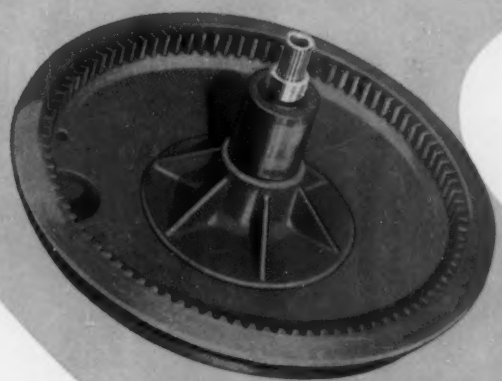
Alco announced that its initial work will be in line with its contract to build the Army Package Power Reactor, currently under construction at Fort Belvoir, Va.

As part of the safeguards necessary a coordinated monitoring system has been established to prevent overexposure of employees to radiation. Residents of the area will be protected by filters which will cleanse air exhausted from the building. Water discharged into the adjoining Mohawk River will be closely monitored for radioactivity.

In an emergency the reactor tank can be emptied and the reactor shut down rapidly through use of a quick opening valve.

Unit saves 2¼ man hours on each shaft machined from

OSTUCO TUBING



VERTICAL TRACTION SHAFT

Unit Crane & Shovel Corporation, Milwaukee, "lowered the boom" on costs by using OSTUCO tubing for vertical traction shafts in its line of heavy construction equipment. By eliminating a center-boring operation, Unit *saved 2¼ hours machining time on each shaft.*

OSTUCO tubing has tremendous strength to absorb the constant shock and strain to which Unit equipment is normally subjected and machines easily to precision tolerances.

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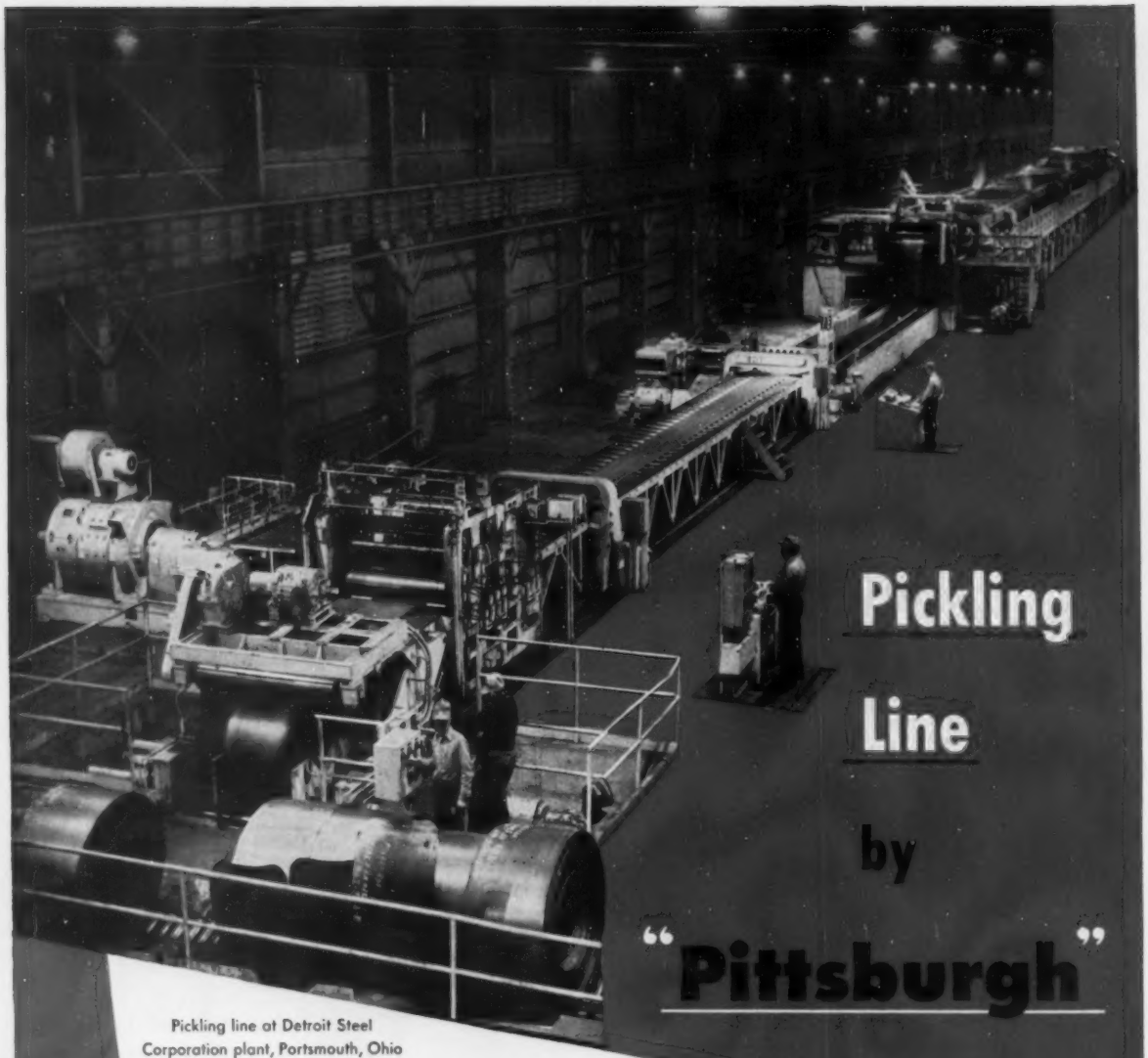

Pickling Line by "Pittsburgh"

Pickling line at Detroit Steel Corporation plant, Portsmouth, Ohio

■ Major installations by Pittsburgh Engineering & Machine Co. in the plants of leading steel producers are noted for superior design and efficient operation.

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REPORT TO MANAGEMENT

Are They Really Serious About Tax Cuts?

From now on until elections, you'll hear a lot more about tax cuts next year. But how much of that talk will be translated into action at the next session of Congress?

The outlook for relief is better than usual. Balancing of the budget this year, even if it did not result in any immediate tax cuts, has put the heat on Congress to come up with something concrete. The heat will also be on the next administration, regardless of party, to cut expenditures as much as possible.

Although George Humphrey, secretary of the treasury, states that a surplus of $3 to $4 billion is necessary to justify a tax cut of any size, there will be a lot of scrambling to get close enough to that figure next year.

The question is: Where will the tax cuts come, and in what areas will they occur? In other words, who's going to benefit?

Raising Exemptions Comes High

Democrats continue to plug for an increase in personal exemptions from $600 to $800. This has been a rallying point for so long it is almost a party slogan.

But it is also an expensive way of cutting taxes, from the point of lost revenues. One estimate is that such a cut would result in a loss of $4.7 billion in tax revenues, and no surplus of that size is in the cards.

Small Business Gets a Nod

Both parties are plugging for tax aid for small business. The Democrats recommend a graduated system of corporate income taxes. Undoubtedly, this would be a big aid to small businesses, but not to large companies.

Republicans also promise aid to smaller corporations, but are less specific. The Cabinet report to the President on small business recommends that taxes be reduced from 30 to 20 pct on corporate incomes up to $25,000. This is likely to be the President's view.

Something to remember about small business tax aid is the problem that faces a small business whose income approaches the $25,000 point. A small expansion could put it over that mark, with a resulting 22 pct increase in corporate income tax level.

The obvious effect could be a tendency to stay within that limit or to form a different corporate setup to dodge that barrier. So the sharp line at $25,000 isn't a perfect solution.

Overhauling the Tax Code

The talk about a possible overhaul of the entire tax code isn't all just talk. Although it may not even get to a vote, a "revision" bill is entirely probable. A Democratic majority in both houses could result in action.

Complaints against loopholes are so universal that tightening may be in order, although there is no unanimous opinion in Congress over what constitutes a loophole, or a legitimate exemption.

One important part of the tax code that is certain to receive study, and is most likely to be changed, is the section involving corporate organization and re-organization.

This is almost certain to be tightened to prevent corporations reorganizing purely as a tax dodge. Whatever form revision would take is still up in the air, but an attempt to do so is almost definite.

INDUSTRIAL BRIEFS

Better Beads . . . All-State Welding Alloys Co., Inc., White Plains, N. Y. has completed a center for research, development and manufacture of alloys and fluxes for the welding shop or department. This marks the company's fifth expansion project.

Takes The Sting Out . . . Westinghouse Electric Corp. and Dow Corning Corp. have developed a high-temperature, high-voltage insulating material. The new insulation is a solventless silicone resin which can be formed into thick sections of solid, heat-resistant insulation for use in complex electrical equipment.

Peace Of Mind . . . Standard Pressed Steel Co., Jenkintown, Pa., using commercial and private flights for sales, service and other work, has provided a $75,000 life insurance policy for all people flying on company business. The policy also covers benefits for dismemberment and loss of sight.

Fireproof Investment . . . Approximately $35 million is being spent by two Canadian subsidiary companies of American Smelting and Refining Co. for expansion. Lake Asbestos of Quebec, Ltd., is investing more than $32 million to develop asbestos ore bodies at Black Lake and to construct a $9 million fibre mill. Federated Metals of Canada, Ltd. is opening non-ferrous refineries at Toronto and Montreal. New plants will refine non-ferrous white metals and produce solders, babbitts, and lead products.

Know Thy Product . . . Fenn Manufacturing Co., Newington, Conn., has opened a metallurgical laboratory to maintain full control over the physical and chemical qualities of all raw materials purchases, and provide its customers with a thorough metallurgical analysis of any metal under consideration for processing on Fenn metal forming equipment.

JOSEPH N. Pew Jr., Sun Oil Co.'s board chairman, far left, watches presentation of award commemorating Sun's support of the Armed Forces reserve program. Ceremony was held at the Company's Marcus Hook (Pa.) refinery.

Jolly Good Deal . . . Pangborn Corp., Hagerstown, Md., has signed a licensing agreement with Hepburn Conveyor Co., Ltd., Wakefield, Eng., for sole manufacturing and sales rights of Pangborn equipment in the following countries: England, Scotland, Wales, Ireland, Australia, New Zealand and Union of South Africa.

Two is Company . . . Aircraft Products Co. has set up two new divisions — Tactair Valve Div., which will manufacture and distribute the line of high precision valves and specialized hydraulic and pneumatic components for aircraft and industrial use; and the Tactair Autopilot Div. will produce a new line of autopilots for the business aircraft field.

Going to Boeing . . . United Aircraft Products, Inc., Dayton, O., has been awarded a series of contracts totaling approximately $5 million for the furnishing of its Deaerating Cold Weather Oil System and the Hot Fuel Priming System for incorporation in the Boeing built military aircraft known as the KC-97.

Trading Team . . . Among businessmen who have voluntarily offered their services to comprise a five-man trade team for the U. S. Trade Mission to Belgium are: John H. Benetz, president and owner of the Bridge Tool & Die Works, Inc., Philadelphia and Robert E. Harper, president and secretary, National Business Publications, Inc., Washington, D. C.

Brush Up . . . The Brush Beryllium Co., Cleveland, was awarded a contract by the Atomic Energy Commission to supply 500,000 lbs of atomic reactor grade beryllium metal over a five-year period.

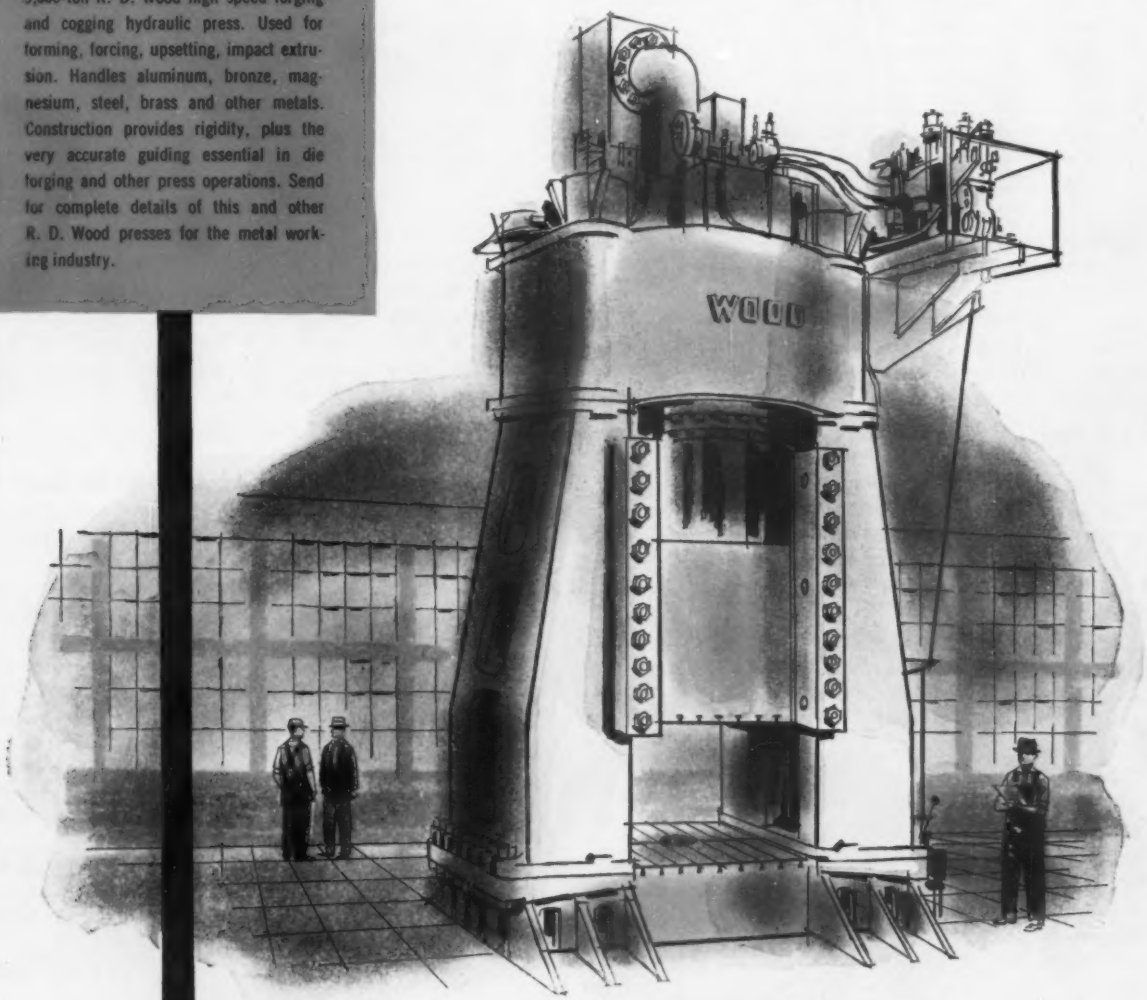
3,000-ton R. D. Wood high speed forging and cogging hydraulic press. Used for forming, forcing, upsetting, impact extrusion. Handles aluminum, bronze, magnesium, steel, brass and other metals. Construction provides rigidity, plus the very accurate guiding essential in die forging and other press operations. Send for complete details of this and other R. D. Wood presses for the metal working industry.

150 years of excellence

This is not an empty claim. It's a fact and a challenge.

In more than 150 years of service to industry, R. D. Wood's name has never appeared on a press of inferior quality.

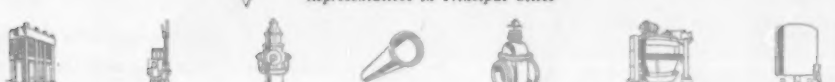
You can *see* the proof of R. D. Wood quality in the precise design, select materials, and sound craftsmanship that distinguish our presses. And you can *see* the results of this quality in smooth, dependable performance, increased production, economical maintenance.



R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

Representatives in Principal Cities



MAKERS OF HYDRAULIC PRESSES AND VALVES • FIRE HYDRANTS • CAST-IRON PIPE • GATE VALVES • GAS PRODUCERS • ACCUMULATORS

CONTINENTAL: Prestige Without Profit?

At least, that is the thinking behind Ford Motor Co.'s 1957 plans for the division . . . Production schedules are cut and dealers are dropping like flies . . . But advertising value is worth it—By *T. L. Carry.*

◆ ALTHOUGH there is still money to be made in the prestige car field, industry executives are beginning to wonder if the Continental Div. of Ford Motor Co. is going to end up in the black in 1957.

Production schedules for next year have been drastically cut. Continental officials say that the market has dropped considerably since the car was introduced last year. They blame this on the fact that many people ordered the car sight unseen before it even went into production.

Original production of about 2300 cars the first year has been tentatively cut to about 1000 units for 1957. This is a sharp drop and by ordinary bookkeeping standards in the industry it definitely is not a money making proposition.

At least it isn't when you compare it to Cadillac's production for the 1956 model year of over 154,000 units.

Fame vs Fortune . . . However, Continental now claims that it was not originally conceived to make money. The car is being built to lend prestige to the Ford Motor Co. In other words, the institutional advertising involved in its production is well worth the cost.

At the same time, the division is taking steps to eliminate many of the dealers who were first granted franchises to sell the car. This is not being done by canceling franchises but many of the original 652 dealers have found that it would be better not to sell the Continental. In a lot of markets, there may not be more than three of the cars sold in 1 year.

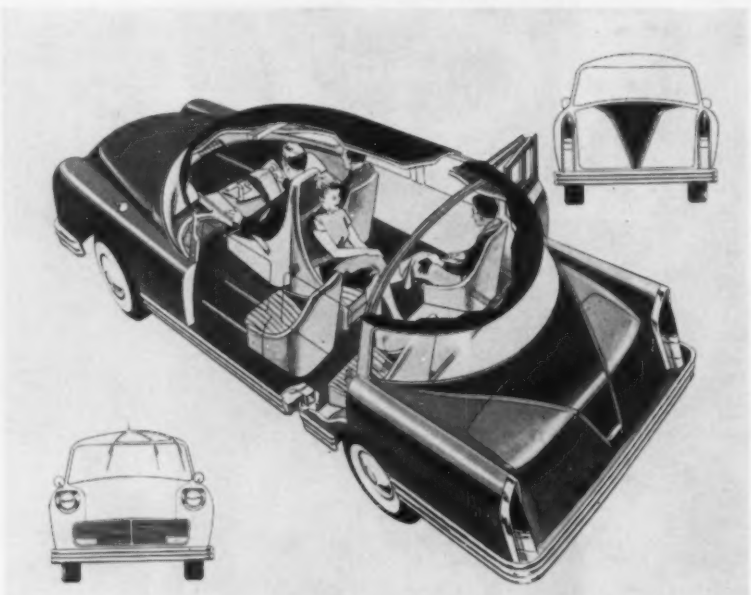
The dealer body at the present time is somewhere in the vicinity of 500 and sales executives expect that the number will decrease more next year.

Style vs Engineering . . . The philosophy behind the Continental is that major changes are not going to be made on a yearly basis as they are for other prestige cars. The theory is that an old Continental will still have the same amount of prestige as a new one regardless of its age. It's all part of the buildup and may or may not help sales directly.

However, regardless of the absence of styling changes for 1957, the division is introducing some engineering advances for next year.

First of all, the engine, which is a highly modified Lincoln powerplant will have a 10 to 1 compression ratio. Its displacement will be the same and, as usual, the hp is not announced. However, it's a safe bet that the

Tomorrow's Safety Car En Route



IDEAL AUTO SAFETY is designed into this drawing board model developed by Liberty Mutual Insurance Co. and Cornell Aeronautical laboratory. Driver sits in front center, steers with levers. Note how passengers are seated.

How Great Lakes Steel *launches* quality

You're at 400 feet, banking for a good close look at the unloading operation of the *Ernest T. Weir*. She's packed to the gunwales, stem to stern, with ore—tons of iron-bearing food for Great Lakes hungry blast furnaces.

What's this got to do with turning out top-quality steel at Great Lakes? Plenty! For quality pig iron can only come from quality raw materials—like the *Weir's* rich cargo. And, of course, quality pig iron is the very backbone of top-quality steel.

Control of quality at Great Lakes begins right at the mines. In fact, each ore source is picked with painstaking care. Then, repeated checks in the mines—*double checks* here at the unloading docks—put the quality of Great Lakes raw materials beyond question!

It's that kind of control (from start to finish) that gives our flat-rolled products uniform quality—assures that they will reach our customers exactly when and as ordered. We're ready to talk your steel needs whenever you are.

GREAT LAKES STEEL CORPORATION

Detroit 29, Michigan • A Unit of

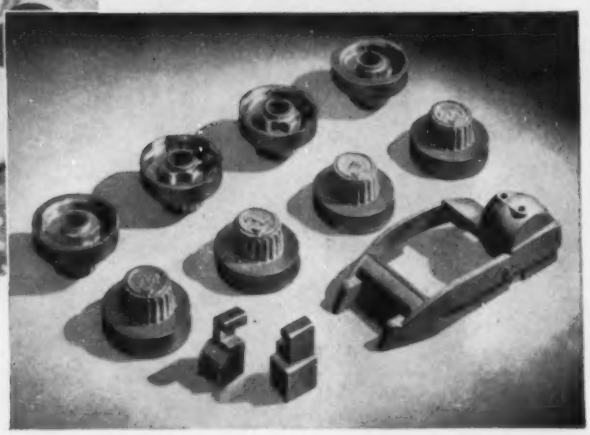
NATIONAL STEEL CORPORATION

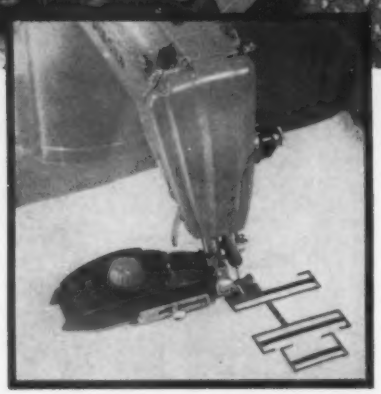
District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

TO ASSURE TOP-QUALITY OPEN-HEARTH STEEL . . . iron ore (shown stockpiled here), coal and limestone—all of known source and quality—are sampled and tested over and over again by Great Lakes Steel raw material analysts.

NUMBER 2 OF A SERIES

PRODUCTION SHORT CUTS WITH **ZINC** DIE CASTINGS . . . . .





SEWING UP A PRODUCT DESIGN AT SINGER

Part of the story behind the development of the Singer Automatic Zigzagger (an attachment for use with Singer sewing machines) reveals how—through the use of ZINC Die Castings—efficiency and economy can go hand-in-hand. The castings in the new assembly are shown at the right.

The first consideration in developing the Zigzagger was to establish a basic design which would permit milady to simply and efficiently create a variety of decorative effects merely through the interchange of different stitch patterns. The ultimate design called for some unusually shaped components which led Singer engineers to the specification of ZINC Die Castings. These parts are the cover frame, two presser bar seats and the eight interchangeable stitch patterns.

The economy of die casting the Zigzagger components stems from high speed multiple-cavity production, achieving dimensionally accurate, ready-to-assemble parts. The eight stitch patterns are cast with the sewing design engraved on each pattern head and, as can be seen in the underviews, unusually shaped cam tracks also are obtained on these castings. The smooth surfaces of the ZINC Die Cast cover frame require little preparation for a handsome paint coating.

For possible answers to *your* production problems, send for our brochure and contact any commercial die casting company.

Send for your copy.

The New Jersey Zinc Company, 160 Front Street, New York 38, N. Y.

ZINC
FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) **ZINC**

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
SEPT. 22, 1956	41,296	16,593
SEPT. 15, 1956	65,063	21,675
SEPT. 24, 1955	127,038	24,766
SEPT. 17, 1955	124,679	21,805

*Estimated. Source: *Ward's Reports*

car will deliver somewhere in the vicinity of 290 hp.

Other changes involve the air intake for the air conditioner. This has been placed under the hood and will involve installation of a large amount of ductwork to deliver air to the evaporator which is still located in the trunk of the car.

The frame for the Continental has also been lightened. Engineers discovered that the heavier frame used in the first models was not necessary. They found that torsional rigidity is still at a satisfactory level with a lighter frame so cross members for 1957 have been reduced from 7 to 6.

Production schedules for next year are based on dealer orders. However, it is pointed out that schedules are actually set from month to month and there is always the possibility that they can be revised upwards if the situation calls for it.

Retooling:

Two-year cycle is becoming the mode in Detroit.

It's a pretty well accepted fact now that most automakers are moving to a 2-year cycle in making major changes in their cars. Up to 1955, it was the accepted practice not to make a major change any sooner than 3 years, because of the costs involved in tooling and the time it took to amortize tools.

However, the advent of more and more automatic machines has reduced the amortization time. Also, the competition in the industry has increased to the point where new models every 2 years are almost mandatory.

It's questionable where such a development might leave the two independent producers in the industry. Admittedly, neither American Motors nor Studebaker-Packard could very well afford to adopt such a cycle at this time.

But the Big Three seem determined to go through with it.

Among the cars which had a major change this year are all the Chrysler products, Ford, Mercury, Oldsmobile, Cadillac and Buick. Those that are merely being facelifted will come in for major changes in 1958.

The cycle is being staggered by some of the Big Three and it will have the effect of presenting some completely changed cars to the public every year.

If this is the case, the new pattern will have an extremely good effect on the machine tool industry. In addition to the tooling for production models, there will also be the other half of the business which is concerned with capital expansion. This, plus the fact that automakers are going in more and more heavily for manufacture of their own parts. Latest word is that some of the Big Three are aiming 70 pct to 30 pct ratio.

AUTOMOTIVE NEWS

Crashproof Car On Way

Announcement that a prototype crashproof automobile is now being built has stirred some interest in Detroit circles but other than that no one cares to comment on the vehicle.

Industry executives and engineers say that they would rather wait until the car is actually built and they have had a chance to study some of its features.

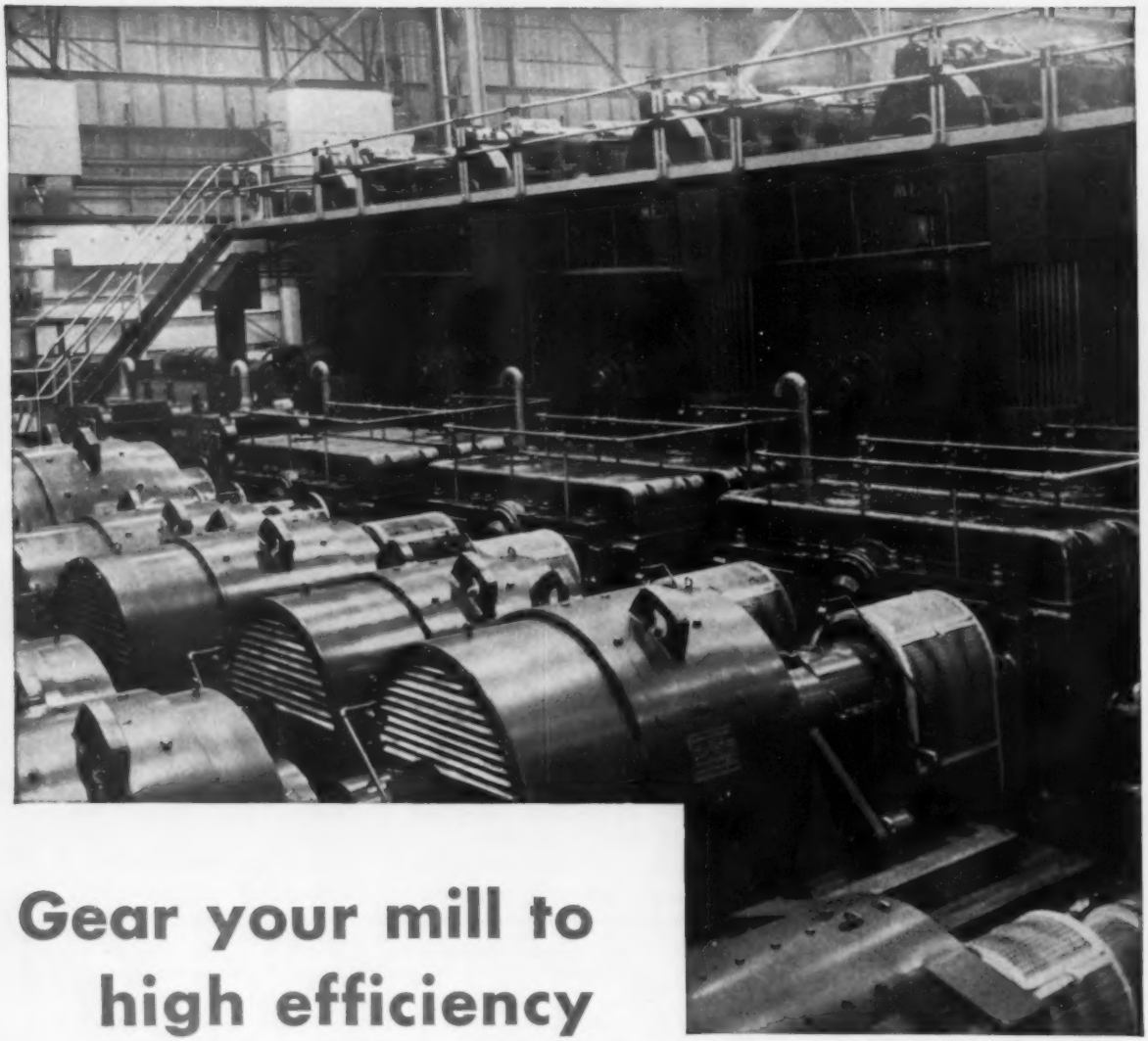
The car is jointly sponsored by the Liberty Mutual Insurance Co. and the Cornell Aeronautical Laboratory in Buffalo, N. Y. The latter institution is not to be confused with the Cornell University Medical College of New York which has also been carrying on experiments in auto safety.

Sponsors of the crashproof auto claim that a person could emerge unscathed from a 50 mph crash.

It's doubtful if the whole car would ever be adopted by the auto industry, but certain features might be.

THE BULL OF THE WOODS — **By J. R. Williams**

YE GODS! THAT FILTHY REPAIR GANG AGAIN! EVERYTHING THEY TOUCH, LEAN ON OR FIX HAS TO BE SCOURED FOR A WEEK TO BE CLEAN AGAIN! WHY CAN'T WE REPAIR OUR OWN MACHINES IN TH' TOOL ROOM?
YOU KNOW WE CAN'T STOOP TO THAT SORT OF THING AFTER LONG YEARS OF STUDY TO GET UP OUT OF PUDDLIN' IN GREASE!
COME ON, YOU MICROMETER GAZERS, SHOW US TH' MACHINE YOU WRECKED! GO POWDER YOUR NOSES WHILE A COUPLE OF REAL MACHINISTS GIT THINGS GOIN' AGIN!
J.R.WILLIAMS 9-26
THE DUDES
© 1956 by NEA Service, Inc. T.M. Reg. U.S. Pat. Off.



Gear your mill to high efficiency

Give enclosed gear drives extra protection with *Texaco Meropa Lubricant*. The longer lasting extreme pressure properties of *Texaco Meropa Lubricant* enable it to cushion shock loads and give full protection in the severest service. As a result, gears and bearings last longer, require less maintenance expense.

Texaco Meropa Lubricant contains exclusive polar additives. They give it exceptional adhesive qualities—ability to stay on gear teeth under all conditions. Moreover, *Texaco Meropa Lubricant* resists thickening, does not foam, won't separate in use, storage or centrifuging. It is non-corrosive to all gear and bearing metals.

In roll stand circulating systems, use *Texaco Regal Oil*. This turbine-quality oil resists oxidation and sludging, fully protects oil film bearings, keeps the entire system clean.

Let a Texaco Lubrication Engineer help you improve and economize your operation. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

Industry Fights For Atomic Energy Rights

AEC now favors private industrial nuclear power development . . . But Capitol Hill fight looms . . . Fear is that nuclear power may remain government monopoly if present trend continues unabated—By G. H. Baker.

◆ A LIVELY CONGRESSIONAL battle is brewing—and will come to a boil early next year—over who'll take the lead in developing the atom for non-military (industrial) purposes — private enterprise or the federal government.

The U. S. Atomic Energy Commission, now finally controlled by Eisenhower appointees (Truman appointees hung around for a while), believes nuclear energy can be developed most effectively by letting industry take the initiative in building power plants.

But a majority of Democrats in Congress is insisting that the government must retain tight control over all applications of the atom —both military and industrial. This group claims that the United States would "lose the atomic race to Russia" if nuclear research were transferred from bureaucratic hands to industrial laboratories.

Encouragement Needed . . . Congressional Republicans are going to put up a stiff fight to channel nuclear projects into industrial market places and away from the existing near-monopoly held by the government.

Many congressmen are fearful that the infant atomic energy industry will remain entrenched in government hands if some positive encouragement to private contractors is not soon forthcoming.

This kind of delaying is just what the government power lobby wants, and the more frustrating the rules for developing the atom by industry, the greater chance that private enterprise will be slowly frozen out of the development picture.

Progress Is Slow . . . For example: The Atomic Energy Commission currently is negotiating with only five different industrial groups that want to develop industrial uses for nuclear energy. Progress in letting the contracts has been astonishingly slow. At the present snail's pace rate, the entire nation will have only about 690,000 kw of nuclear generating capacity by 1960, including the giant Shippingport, Pa., reactor.

What bothers the electric power industry is that the government, once involved in any industrial project, always seeks to broaden its sphere of operation. The multi-million dollar Tennessee Valley Authority was set up 20 years ago for the announced purpose of developing hydro-electric power, but the TVA has long since completed this job but still demands more.

So it is with atomic energy. If industry isn't permitted to do the job, the government will slowly but surely spread its monopoly.

SBA Acts to Provide Business Loans

◆ THE EISENHOWER ADMINISTRATION is going to try to ease whatever pressure its general tight money policies are putting on small businessmen by promoting its own lending services.

The government's multi-million dollar lending agency, the Small Business Administration, is reassuring President Eisenhower that it has plenty of money to meet the anticipated needs of all "sound" small firms which are unable to obtain credit elsewhere.

The SBA has called a meeting of its National Council of Consultants—bankers, industrialists and financiers who advise the agency —to work out methods of informing businessmen of the availability of government loans. SBA now has on hand some $50 million for loans to small firms, and larger companies can get funds directly from the Federal Reserve Bank if other sources are dried up.

By pushing the government's lending plans, Administration officials apparently hope to keep wild speculation and unsound business expansion in control, but still provide necessary funds for more conservative business projects.

By replacing government loans for loans which would normally be made through banks and other institutions, the money managers believe they can keep a finger a little closer on the direction economic expansion will take in the next few months, and thus hold back any surge of inflation.

In addition, substituting government lending for bank lending points up—just before election—one of the government's most popular programs. The tightness of money also has one other effect—it may help soften some of the forthcoming wage demands.

"built to serve the growing West"

There's a new word in our slogan!

Keeping pace with the West's rapid growth, Kaiser Steel is now going forward with the biggest expansion in its history—a $113,000,000 program that will increase steel production by 40 percent—bringing into operation by 1958 more new steel production and finishing capacity than was built into the original Fontana plant during the war years 1942-45.

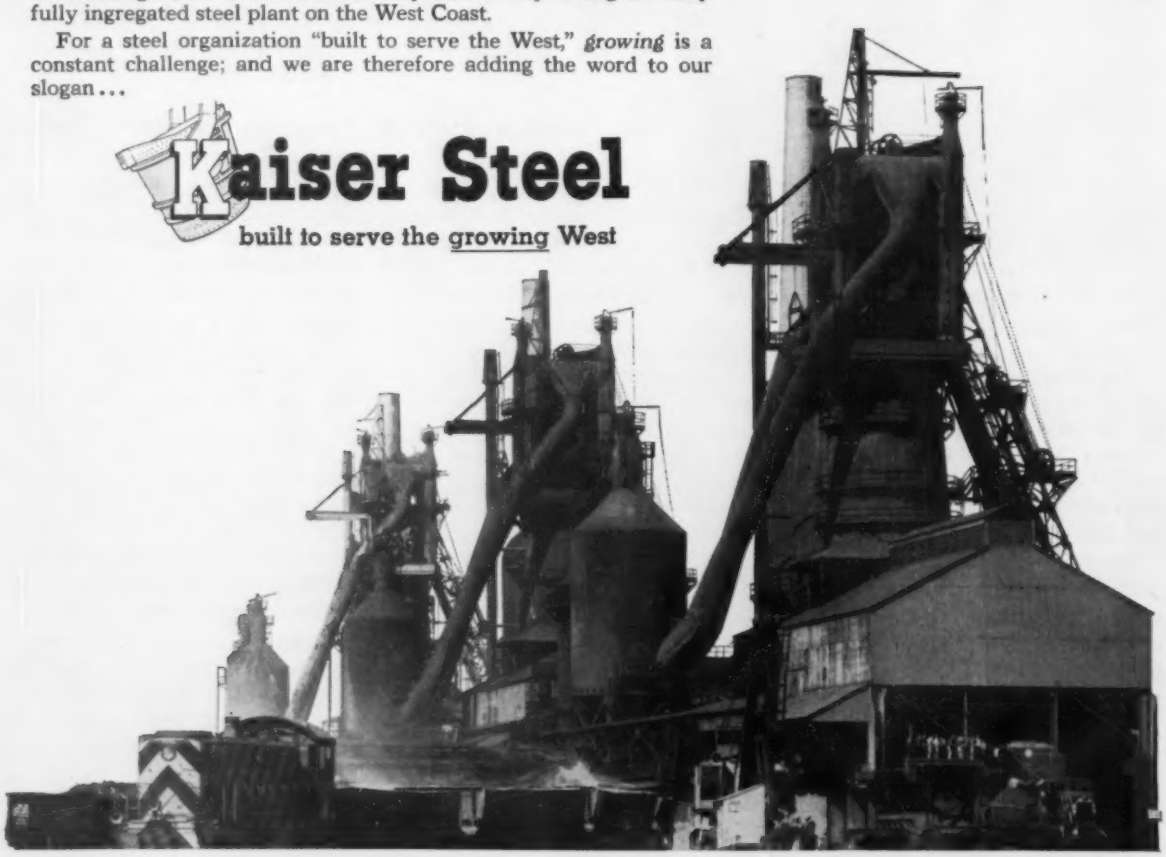
This is Kaiser Steel's vote of confidence in the continued growth of the West.

Previous expansion programs have made Kaiser Steel the West Coast's largest, most diversified steel producer—operating the only fully ingregated steel plant on the West Coast.

For a steel organization "built to serve the West," *growing* is a constant challenge; and we are therefore adding the word to our slogan...

Kaiser Steel

built to serve the growing West



Farwest Sets Pace in Natural Gas

Metalworking there will get healthy share of $7.3 billion to be spent for new pipelines and utility expansion . . . Area shows biggest growth in new gas customers . . . Leads in appliance designing—By *R. R. Kay.*

◆ KEEP A SHARP EYE on the natural gas industry in the Farwest. What's happening there will have a big impact on tens of thousands of metalworking firms across the country. And pretty soon, too.

West Coast Sets Pace . . . The area is setting the pace in an industry that will spend billions of dollars nationally in the next few years. Look for West Coast metalworking to get a healthy share of the $7.3 billion earmarked for new pipelines and utility company expansion. The spending is going on right now and will continue through 1959.

A program to give California utilities 650 million cu ft more of gas per day is in the works. Federal Power Commission has approved 350 million cu ft and is looking over applications for the balance.

Metalworking Benefits . . . All this adds up to a terrific market for a long list of metalworking products. Mills and manufacturers serving the natural gas industry already feel the growing demand. And forward-looking firms, to get a bigger piece of the market, are building new branch plants or warehouses here, or expanding what they already have.

As the billions of dollars pour out from the West Coast, makers of this equipment should do well indeed: regulators, valves, meters, plastic and steel pipe, vent parts, thermostatic controls, fittings, couplings, heavy construction tools, pipe-laying equipment.

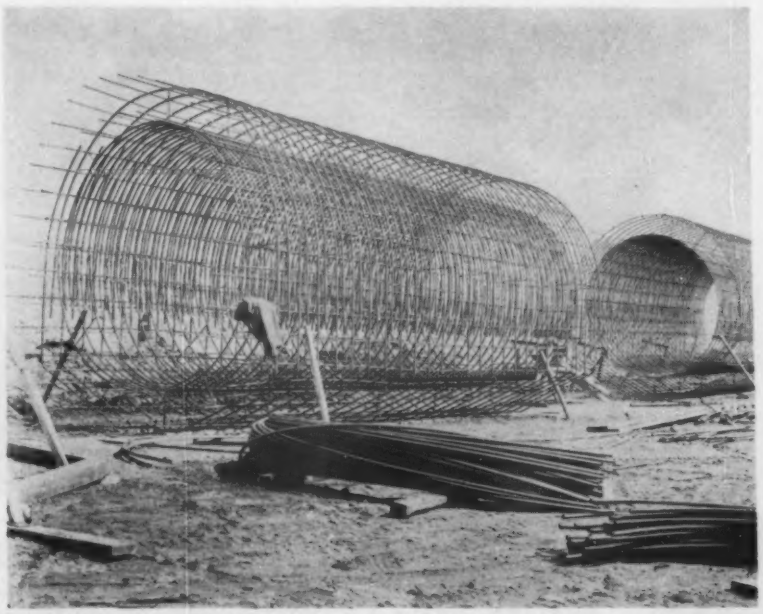
Dual Leadership . . . The Farwest will hold the leadership on two major fronts:

(1) Biggest growth in number of new gas customers. Aside from the giant new Pacific Northwest market—last major U. S. population and industrial area to get natural gas—southern California continues to press for more and more. Los Angeles area utilities added 100,000 new customers a year for the past 10 years. They expect the pace to keep right on for years to come.

(2) Design leadership in gas appliances. West Coast manufacturers, centered in Greater Los Angeles, are quick to set new trends. And they have the know-how to promote them. Right now they're pushing color; also, built-ins, top burners, rotisseries, ovens.

Power Lack Tackled

Seattle City Light expects to ask for a federal license to build a 600,000 kw dam on the Pend Oreille River, near the Canadian border. Called the "Boundary Project," the development is planned to approach the size of the Priest Rapids installation on the Columbia River.



LIKE HUGE SKELETONS, these steel reinforcing frames made by Colorado Fuel & Iron Corp. are ready to be covered with forms in which concrete will be poured. Completed sections will make up a pressure conduit for the waters of the Pine and Kettle creeks, near Colorado Springs.

New Kearney & Trecker's "Bull's-Eye" Control Grouping

Available under Tool-Lease program

TF Series milling machine's controls are conveniently grouped up-front where they belong to assure accurate settings ...measurably reduce operator fatigue

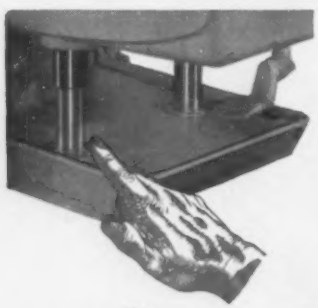
ONE look tells why the new TF Series milling machines — Plain, Universal and Vertical — are so easy to operate. "Bull's-eye" up-front control grouping permits operators to achieve exact settings faster, more adeptly and with greater ease than ever before. This "Fron-Trol" convenience is the key to low-cost production . . . because it increases the operator's efficiency and measurably reduces fatigue through elimination of wasted steps.

The "bull's-eye" knee and saddle-mounted controls are safety-interlocked and include feed selection, directional Mono-Lever table feed and rapid traverse, automatic cycle table feed and rapid traverse controls, front-mounted table handwheel, saddle clamping gib and backlash eliminator and hand and power directional controls for knee and saddle movements.

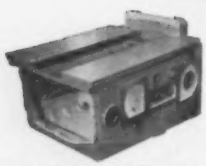
In addition, the new TF's give you a superior combination of outstanding design and operating features never before available on any other knee-type milling machines. They're built in five sizes — No. 2 to No. 6 from 10hp to 50hp.

Why take less than the latest when you want new milling machines? You can get all the facts on new TF Series machines from your Kearney & Trecker representative — call him or mail coupon direct to factory today.

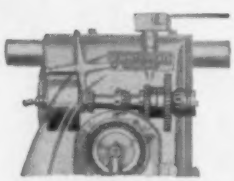
A few of many reasons why TF Series milling machines are so easy to operate



Twin Screw Knee Support — Exclusive double-support arrangement most effectively distributes weight of new machines' much wider, heavier knee, saddle and table. Balanced design substantially increases stability under heaviest loads . . . offers greater resistance to torsional thrust under all cuts . . . halves the wear factor, assuring greater, longer-lasting accuracy.



Heavier, Wider, One-Piece Knee — The TWIN SCREW arrangement supports the heavier, larger knee. Span and length of ways is increased considerably, providing fuller saddle support . . . lasting accuracy . . . substantial reduction of way and gib wear.



Three-Bearing Spindle — Complete assembly consists of three heavy-duty bearings, flywheel, a train of wide-faced forged steel gears. Rigidity of spindle unit contributes to increased cutter life . . . excellent finish . . . quieter and vibrationless operation.

Massive Column — Solid back, double-box section column is scientifically ribbed throughout to rigidly withstand heaviest cutting forces. Full bearing column face affords maximum support for the knee. Cross-mounted motor assures maximum ventilation, easy access for routine maintenance.

KEARNEY & TRECKER
MILWAUKEE
BUILDERS OF PRECISION AND PRODUCTION MACHINE TOOLS SINCE 1898

KEARNEY & TRECKER CORP.
6792 W. National Avenue, Milwaukee 14, Wisconsin
Please send me Catalog No. TF-50 with details on new line of TF Series Plain, Universal and Vertical milling machines.

Name.....
Title.....
Company.....
Address.....
City..... Zone..... State.....

Equipment Sales Up In First Half

Government statistics bear out predictions that industry would make record outlays for machinery in 1956 . . . Metalworking equipment shipments in second quarter $81.5 million higher than 1955—*By E. J. Egan, Jr.*

◆ U. S. PRODUCERS shipped approximately $289.1 million worth of all types of metalworking machinery in the second quarter of this year. Total shipments for the like period in 1955 were only $207.6 million.

Shipment breakdown for the April-June quarter this year runs like this: cutting-type machines, $211,065,000; presses and other forming and shaping equipment, $78,062,000. In the same 90-day span last year, cutting and grinding machine shipments were $157,562,000; deliveries of forming equipment added up to $50,047,000.

Backlogs Big . . . New orders for the 1956 second quarter were approximately $284.3 million, down about one pct from the $288.4 million in new business that builders wrote during the comparable 1955 period. Drop was caused by a dip in demand for metal forming machinery; only $55,416,000 from April through June this year compared with $102,229,000 in the same stretch of 1955.

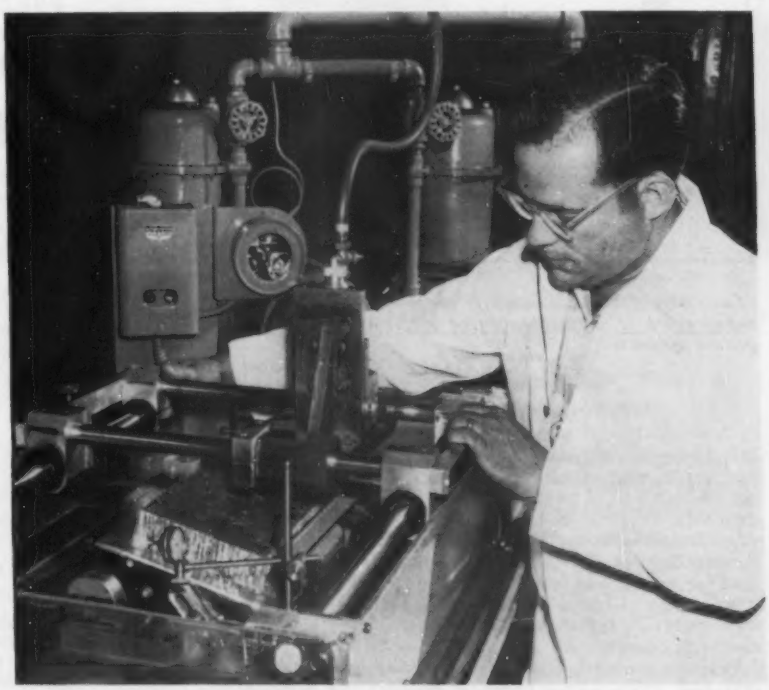
Foregoing statistics come from the Metalworking Equipment Div., Business & Defense Services Administration. Same agency credits builders of cutting and grinding machines with $586.4 million in unfilled orders as of June 30, figures this out as a backlog of 8.3 months' production.

You'll have to wait a bit longer for a piece of forming equipment, though. BDSA says this segment of the industry had an unfilled order backlog of 11.4 months at the end of June. That's about $296 million of work.

Foreign Trade Better . . . Census Bureau of the Dept. of Commerce, reporting on first quarter exports and imports of metalworking machinery, shows a gain in both areas over the final quarter of 1955.

Exports of U. S. machines are not what they once were, however. Cutting tool total for the first 90 days this year was approximately $22.6 million, up three pct from the $21.9 million sent abroad in the final 1955 quarter. Exports of forming and shaping machines in the initial 1956 period were $10 million, down four pct from the $11.9 million total of the final 1955 quarter.

As for imports, of foreign machine tools into the U. S., domestic builders lost only $5 million to this source in the first quarter of 1956. Equipment shipped in from West Germany accounted for 34 pct of the total; Swiss machines made up another 30 pct. Great Britain, Italy, Sweden, and Canada followed in that order with smaller claims to popularity.



VACUUM CHUCK is unique feature of this new portable machine used at Northrop Aircraft, Inc., for cutting aluminum honeycomb material. Work holds steady while knife rotates at 30,000 rpm.

REVERE COPPER EXTRUSION shown attached to skirtboard before full assembly, which you can see below in exploded view. A matching bar, similar to the one shown is part of the "packaged" HANCO unit and is fastened to the opposite side of the screen. Units, in turn, are installed on the various types of Vibrating Screens made by HEWITT-ROBINS INC., Passaic, N. J., and are known as the HEWITT-ROBINS HANNON Electric Screen Heaters.

CLOSE-UP showing end of the Revere Copper Extrusion.

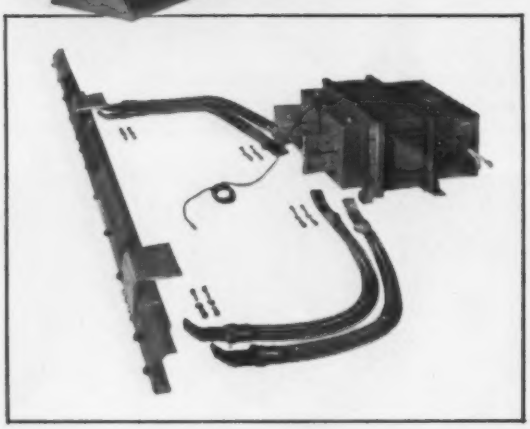
Revere Copper Extruded Shape

in Hanco Electric Screen Heater

out-performs

former copper casting

on 4 counts



"Customers of F. R. Hannon & Sons are now assured of many years of maintenance-free performance plus improved products."

Says T. W. HANNON, *Vice-President, General Manager*
F. R. HANNON & SONS, Canton, Ohio

Mr. Hannon continued, "For a number of years we had experimented with many different types of materials which would be non-porous, free from any burrs or voids, capable of maintaining a straight leading edge and able to carry 1500 amperes at 5 volts. The Revere Copper Extrusion meets these requirements. And for the rugged use to which our machines are put it would be virtually impossible to maintain satisfactory operating results without the use of this extruded electrical conductor."

Perhaps there is a Revere Product that can help you give *your* customers a superior product, or help cut your production costs. You'll never know until you call the Revere Office nearest you and ask to have a T. A. (Technical Advisor) call. Why not make that call today?

Here's the Score!

COPPER EXTRUDED SHAPE	COPPER CASTING
1—12 foot mill lengths offer flexibility, eliminating both welds and scrap	1—60" casting required additional welded joints
2—Shape offers lack of porosity	2—Casting gave porosity problem
3—Shape straightness is superior to casting, giving better electrical contact	3—Bow in casting presented difficulty when fastening screen firmly to contact
4—Higher cost per foot, but cheaper over-all installation	4—Initial cost was lower, but additional welds and scrap resulted in higher final cost, and an inferior finished product

REVERE COPPER AND BRASS INCORPORATED
Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.
Mills: Baltimore, Md.; Brooklyn, N. Y.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N. Y.
Sales Offices in Principal Cities, Distributors Everywhere.

COPPER * BRASS * 18 01 REVERE * ALUMINUM

The Iron Age SALUTES

Dr. Donald S. Clark Newly-elected president of the American Society for Metals, his accomplishments in engineering and metallurgy are exemplary. As professor of engineering at Caltech, he is endeared by thousands of alumni.

Donald S. Clark, new president of the American Society for Metals, has more titles than the Prince of Monaco, and each one he fulfills with the verve of a freshman at a Caltech pep rally. First and foremost, he is known to thousands of California Institute of Technology alumni as "Butch" or "Doc" Clark, the buoyant professor who introduced them to the intricacies of mechanical engineering. He has been teaching at Caltech since 1930.

His research in the dynamic behavior of metals earned him membership on the board of trustees of the American Society for Metals in 1939-40; the Richard H. Templin Award of the American Society of Testing Materials; the Charles B. Dudley Medal of the ASTM in 1951; and the Edward DeMille Campbell lectureship of the ASM in 1953. And that's only part of the story.

He also has been serving as director of placements at the Institute since 1936, and as secretary of the alumni association. To keep these jobs going full tilt it takes a lot of energy, plus efficiency and organizational ability—two qualities of which the genial professor has an overabundance. To his seven assistants at Caltech, he is known as a man who never forgets anything, never loses anything and never throws anything away.

Don Clark was born in Springfield, Mass., on Dec. 27, 1906. He grew up in Burlington, Vt., and moved to California with his family in time to register for his freshman year at Caltech. After breezing to a Ph.D. in mechanical engineering and physics, in the years following he co-authored two text books and picked up additional duties like a magnet. During World War II, he was loaded down with projects for the government.

Another title which he merits, "Master Bookbinder," is unofficial. As a hobby, he binds all the publications of the nine technical societies to which he belongs. With Don Clark at the helm, ASM is due for a busy year.

Ohio Rolls

shaping metal for all industry

Choose from 12 types of
Ohio Iron and Steel Rolls:

Carbon Steel Rolls
Ohioloy Rolls
Ohioloy "K" Rolls
Flintuff Rolls
Holl-O-Cast Rolls
Chilled Iron Rolls
Denso Iron Rolls
Nickel Grain Rolls
Special Iron Rolls
Nioloy Rolls
Ohio Double-Pour Rolls
Forged Steel Rolls

THE OHIO STEEL FOUNDRY CO.
LIMA, OHIO

Plants at Lima and Springfield, Ohio

The Iron Age INTRODUCES

Barney L. Keywell, named president, **The Samuel G. Keywell Co.,** Detroit.

Richard O. A. Petersen, named president, **Virginia Metal Products, Inc.,** Orange, Va.

Following appointments are within the Quality Control Dept. of Weirton Steel Co. Div. of **National Steel Corp. M. H. Kessler,** named asst. vice president; **G. F. Buckle,** named manager, service and inspection; **S. J. Dougherty,** named chief metallurgist; **C. J. Vincent,** named asst. manager, service and inspection.

F. Price Norris, Jr., named asst. to vice president, sales, **Allegheny Ludlum Steel Corp.,** Pittsburgh; **C. R. Mitchell, Jr.,** named director, sales, stainless and specialty steels; **Richard D. Mercer,** named asst. to director, sales, stainless and specialty steels.

William H. Rudiger, Jr., appointed superintendent, warehouse operations, **Hill-Chase Steel Co.,** Maryland.

A. F. Sprankle, appointed director, metallurgy, and asst. to president, **Northeastern Steel Co.,** Bridgeport, Conn.

Robert N. Smaistrla, appointed Houston district sales manager, Laclede-Christy Co. Div. **H. K. Porter Co., Inc.,** St. Louis, Mo.

M. E. Dorman, named manager, dealer and accessory sales, Die Supply Div., **E. W. Bliss Co.,** Cleveland.

William L. Harris, appointed branch manager, Detroit office, **International Packings Corp.,** Bristol, New Hampshire; **Jack R. Mason,** named sales representative, Detroit.

Roger Byrnes, named midwestern district manager, **Adamas Carbide Corp.,** Chicago.

Gilbert E. Dwyer, appointed attorney, Legal Dept., Turbine Div., **General Electric Co.,** Schenectady, N. Y.

Robert A. Rothacker, named general foreman, Union Drawn Steel Div., **Republic Steel Corp.,** Beaver Falls, Pa.

Fred M. Mahan, named manager, **Ross Heat Exchanger Div. of American Standard,** Decatur, Ga.

William P. Hemp, named asst. sales manager, tape products, International Div., **Minnesota Mining & Manufacturing Co.,** St. Paul, Minn.

Leon G. Caldwell, named manager, accounting, Materials and Processes Lab., Large Steam Turbine-Generator Dept., **General Electric Co.,** Schenectady, N. Y.

LESTER N. DUKELOW, appointed manager, sales, High Strength Steel Div., Republic Steel Corp.

GEORGE M. HARTLEY, appointed manager, marketing, Metallurgical Products Dept., General Electric Co., Detroit.

RAY C. CONNER, named general manager, Automotive Div., Vickers Inc., Detroit.

R. D. JONES, named general manager, Automatic Transportation Co., Chicago.

Why use grit that has a "glass chin"?

STEELETTS®

OUTWEAR CHILLED IRON GRIT 4 TO 1

Exhaustive tests in the cleaning department of Commercial Steel Treating Corporation have proved Steeletts cut grit consumption as much as 73.8% compared to chilled iron. One of the largest job heat treat establishments in the nation, this Detroit firm tested both types of grit in the same machine, cleaning the tough scale that results from heat treating.

BETTER FINISH, TOO

Steeletts also imparted a smoother, more uniform finish — and finish is very important to their customers. For more information on advantages and savings you can expect with Steeletts, write now for Bulletin 901-D.

WHEELABRATOR CORPORATION

510 South Byrkit Street
Mishawaka, Indiana

Carra L. Lane, named president, Security Engineering Div., **Dresser Industries,** Dallas, Tex.

Reginald G. Farrar, appointed manager, market research, **The National Supply Co.,** Pittsburgh.

Joseph F. Ramey, named Boston branch automotive and industrial trades sales manager, Coated Abrasives Div., **Minnesota Mining & Manufacturing Co.,** St. Paul, Minn.

Raymond J. Barclay, named manager, manufacturing, industrial computer section, **General Electric Co.,** Syracuse, N. Y.

George A. Hinckley, named manager, New York, sales and service, **Automatic Transportation Co.,** Chicago.

John H. Baer, named sales and service manager, Automotive Div., **Vickers Inc.,** Detroit.

J. E. Weldy, appointed marketing consultant, Marketing Services Div., **General Electric Co.,** New York.

Nicholas M. Esposito, named production manager, **H. W. Loud Machine Works, Inc.,** Pomona, Calif.

Clarence C. Roarick, appointed foundry engineer, **National Engineering Co.,** Chicago.

George Karian, appointed manager, Tabletting Div., **F. J. Stokes Corp.,** Philadelphia, Pa.

John P. Smallwood, Jr., named Houston district sales manager, Metals Processing Div., **Curtiss-Wright Corp.,** New York.

Raymond C. Scheel, named branch manager, New York-New England area, Nelson Stud Welding Div., **Gregory Industries, Inc.,** Lorain, O.; **Alex M. Oleair,** named branch manager, Philadelphia-Baltimore-Washington area.

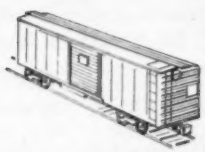
DONALD D. PHILLIPS, appointed direct sales representative, Northwestern Ohio, The R. K. LeBlond Machine Tool Co., Cincinnati, O.

BEN A. SWENNES, named director, engineering, manufactured products, Ingersoll Kalamazoo Div., Borg-Warner Corp.

THOMAS C. SMITH, named chief application engineer, Leeds & Northrup Co., Philadelphia.

PAUL S. WASHBURN, appointed field engineer, Pittsburgh office, Norton Co., Worcester, Mass.

Box-car-size stresses are no problem for Tinnerman SPEED GRIPS®!



A new Lading Strap Anchor developed by the Pullman-Standard Car Mfg. Co., Chicago, is attached to guide plates by Tinnerman SPEED GRIP Nut Retainers. This anchor now makes it possible for shippers to fasten heavy loads in box cars without nailing or shoring. SPEED GRIPS were selected to make these heavy-duty attachments because no other fastener offers so many advantages for blind-location assembly.

SPEED GRIPS are the most efficient method of attaching square nuts to panels. Welding, clinching, staking are eliminated. No special skills or tools are required. SPEED GRIPS snap quickly, easily into panel holes, hold themselves in bolt-receiving position after the guide plate is attached to the box car side. They're rustproof, can be applied after painting, eliminating costly masking or retapping of paint-clogged threads. What's more, the nut "floats" in its spring steel cage to help correct normal misalignment in mounting holes!

Find out about the complete line of SPEED GRIPS and more than 8,000 other SPEED NUT brand fasteners. See your Tinnerman representative soon or write to us.

TINNERMAN PRODUCTS, INC., BOX 6688, DEPT. 12, CLEVELAND 1, OHIO
Canada: Dominion Fasteners, Limited, Hamilton, Ontario. *Great Britain:* Simmonds Aerocessories, Limited, Treforest, Wales. *France:* Simmonds S. A., 3 rue Salomon de Rothschild, Suresnes (Seine). *Germany:* Hans Sickinger GmbH "MECANO," Lemgo-i-Lippe.

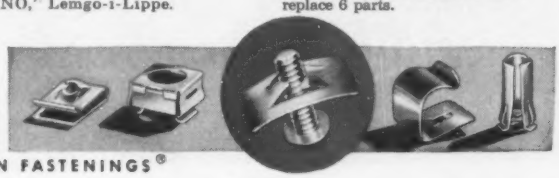
OTHER USES FOR SPEED NUTS

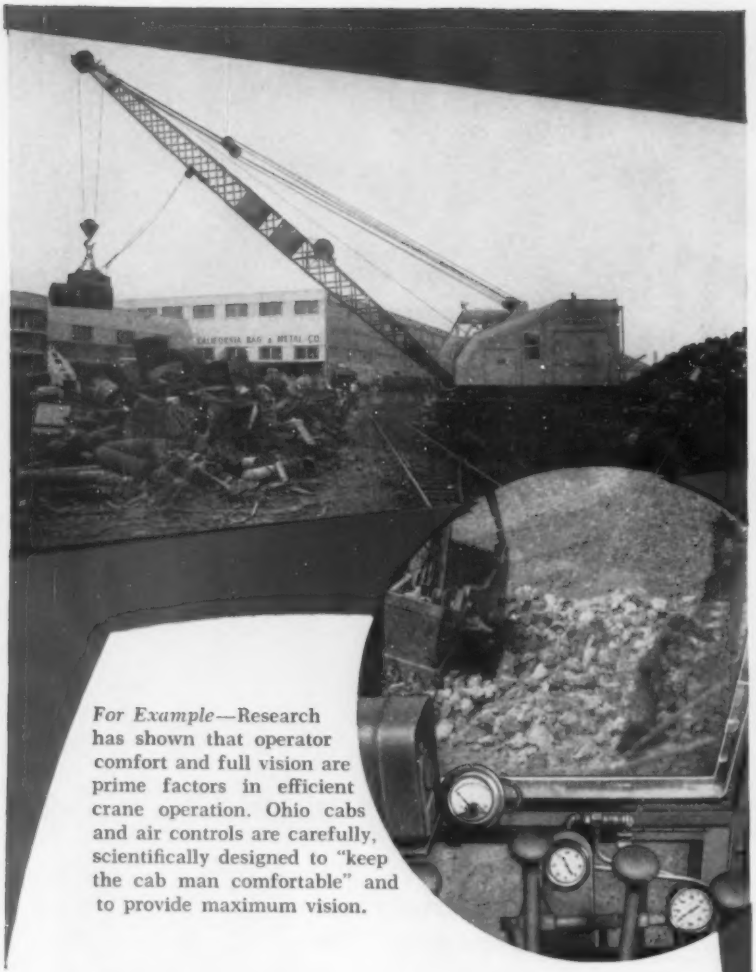
Snap-on SPEED CLIP® cuts costs by replacing 4-piece screw clamp to hold fractional-h.p. motors in place.

On garden tractor, "U" type SPEED NUTS make heavy-duty attachment of hood to yoke, cut assembly costs, parts handling.

Appliance thermostat control is assembled faster, easier, at less cost as 2 special SPEED CLIPS replace 6 parts.

TINNERMAN *Speed Nuts*
FASTEST THING IN FASTENINGS®





For Example—Research has shown that operator comfort and full vision are prime factors in efficient crane operation. Ohio cabs and air controls are carefully, scientifically designed to "keep the cab man comfortable" and to provide maximum vision.

AHEAD OF EVERY NEW OHIO CRANE

years of dependable rugged service

Ohio Cranes are made to last longer. They are more easily serviced — meaning less down time and less tendency to overlook servicing remote points because they are difficult of access. Inherent quality and ease of servicing mean lower cost per year — through many years. If you have a material handling problem you are invited to discuss it with one of our sales representatives or engineers. There's one near you — a note from you will get prompt action! Write today!

100% AIR CONTROLLED

THE OHIO LOCOMOTIVE CRANE COMPANY

BUCYRUS, OHIO

PERSONNEL

E. Forrest Kulp, named manager, Cleveland District sales office, **The American MonoRail Co.,** Cleveland; **V. Wellborn Cook,** named manager, Charlotte district office.

Robert E. Stone, Jr., appointed Los Angeles district manager, Industrial Automotive Div., **The Black & Decker Manufacturing Co.,** Towson, Md.

Arthur F. Peterson, Jr., named asst. manager, New York Ore Div., **Jones & Laughlin Steel Corp.,** Pittsburgh.

Robert B. Stahlhut, named representative, St. Louis, **Gibson Electric Co.,** Pittsburgh, Pa.

Ronald M. Fiandt, named director, automotive products design and development, **Globe-Union Inc.,** Milwaukee.

Milton Paisner, appointed regional sales representative, Industrial Div., **Sweet Manufacturing Co.,** Attleboro, Mass.

W. R. Leopold, Jr., named engineering division manager, **Mueller Co.,** Decatur, Ill.; **Frank H. Mueller,** named vice president and director, engineering.

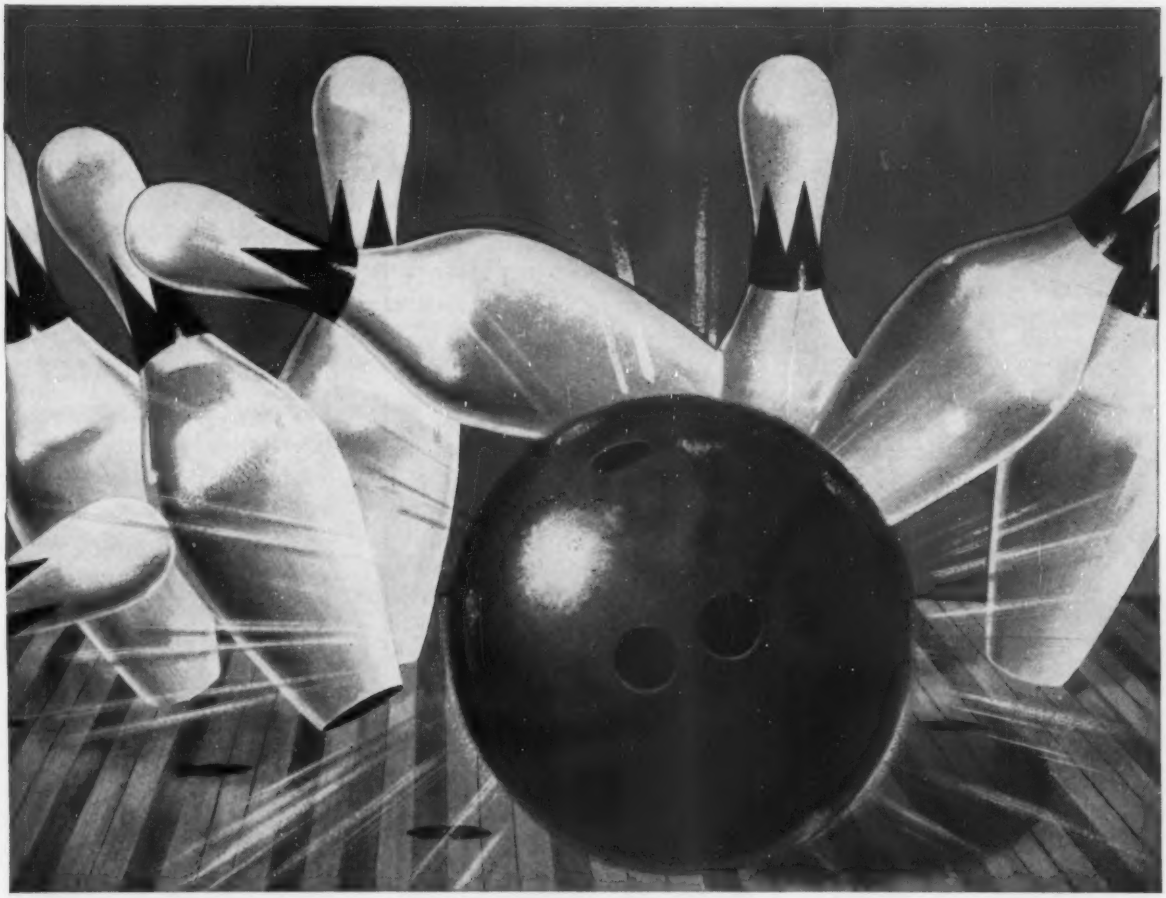
William C. Stratton, named chief engineer, Engineering and Construction Dept., **Dravo Corp.,** Pittsburgh; **A. A. Nilsen,** named manager, ore agglomeration, Engineering and Construction Dept.

Mearll K. Shetler, appointed regional sales manager, Coated Abrasives Div., **Armour and Co.,** Alliance, O.

OBITUARIES

Anthony W. Taylor, 56, director, purchases, **Crucible Steel Co. of America,** Pittsburgh.

Elmer Kyndberg, general sales manager, Cyclone Fence Dept., **American Steel and Wire Div.,** U. S. Steel Corp.



"Finish first in your league"
...with J&L 1200 COLD FINISHED STEELS

When your machining applications require a steel that's tops in quality, machinability, uniformity and surface finish—"J&L 1200" Cold Finished Steel is the answer. It's one of a complete line of premium quality, free-machining bar steels developed over the years by J&L specialists. Thus, we can recommend the right type to help solve your problems.

Operators in shop after shop around the country using "J&L 1200" report:

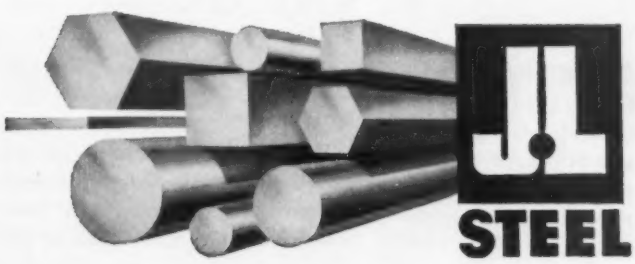
- **Better machine finishes**
- **Improved tool life**
- **Increased machining speeds**
- **Greater uniformity**

"J&L 1200" grades, available in all standard shapes and sizes, meet the compositions published by the American Iron & Steel Institute (AISI C-1213) . . . Society of Automotive Engineers (SAE 1113) . . . and Federal Specification QQS-633.

Use this steel in your own shop to secure better work at lower over-all costs. Results will convince you "J&L 1200" deserves to be a regular specification for your production runs.

Adequate stocks of all J&L cold finished free-machining steels are available in important industrial centers. Phone the nearest J&L District Office or your Distributor today for prompt and efficient service.

Pick the Free-Machining Steel that serves you best—from J&L's complete Cold Finished Line



Jones & Laughlin
STEEL CORPORATION · PITTSBURGH

COLD FINISHING PLANTS AT PITTSBURGH, PA., AND HAMMOND, IND.

"PHOSPHOR BRONZE."®

a tough, resilient, corrosion resistant alloy . . . is a vital part of our daily living . . .

ELECTRIC MOTORS

. . . run better and longer with bearings and wearing parts made of Elephant Brand Phosphor Bronze.

SWITCHES

. . . owe much of their life and usefulness to fatigue resisting parts of Elephant Brand Phosphor Bronze.

SPRINGS

. . . hold their temper and bounce longer and better if they are made of Elephant Brand Phosphor Bronze.

MARINE EQUIPMENT

. . . resists water and weather with engine parts and hardware made of Elephant Brand Phosphor Bronze.

ELECTRONIC EQUIPMENT

. . . functions accurately and efficiently with components of Elephant Brand Phosphor Bronze.

The best bears either of these two marks

ELEPHANT BRAND®

THE PHOSPHOR BRONZE CORPORATION

Subsidiary of The Seymour Manufacturing Company

2 Franklin Street, Seymour, Connecticut

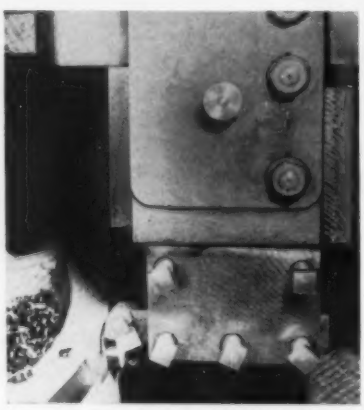
MACHINING: Carbide Tools

Tool chipping problems are eliminated in heavy machining operations with a new carbide tool . . . Cutting edge wear is reduced and insert life increased.

Tool chipping problems have been solved in heavy machining operations at one plant by a change in specifications of carbide tools.

Cutter Wear Reduced

A rough cut ½ in. deep with 0.031-in. feed at 180 sfpm is made on a 101-in. diam cast steel (SAE 1023) roller rings at Smith Engineering Co., Milwaukee. With a standard style clamped insert tool using a new Kennametal general purpose steel cutting grade, cutting edge wear was reduced to one-half that of various other grades of carbides. Insert life was increased about 30 pct because less carbide has to be removed in regrinding. Edge wear formerly had been 0.015 to 0.020 in. in machining one piece.



Clamped insert tool using a new grade takes a "bite."

Regrinding After Each Cut

Best cutting action is obtained by regrinding tools after each cut. One cut on these large castings represents more than one mile of lineal cutting. Exceptional edge strength and elimination of insert chipping were achieved without sacrificing crater resistance. Another factor in the extended tool life is the design of the clamped holder.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 257. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Plastics:

Epoxy resin tools reduce costs

Savings of up to 85 pct in the first cost of vise jaws, mill fixtures, and drilling chucks have been made by Smith Welding Equipment Co., Minneapolis, since the company started making its own tools from compounds based on Bakelite epoxy resins.

Design improvements at Smith are frequent and production runs between changes are short. Tooling costs in such operations can become prohibitively expensive. By switching to epoxy, the company has not only cut tool costs but it has also been able to reduce production downtime and introduce tooling into areas where specialized equipment was prohibited by high cost.

Production of the butt of the company's pipeline cutting assembly provides an example of how plastic tools are used. Nine of the

13 operations required to produce this critical part employ plastic tools.

The new plastic tools are made, in place, on idle equipment using an actual part as a section of the mold so that there is never any question of a part fitting the tool. It takes about half an hour to line up and pour the resin. Practically anyone familiar with tooling processes can usually learn to use the material in a short time. The compound hardens overnight.

Five matched pairs of chuck jaws are used on this machine.

Epoxy tools can be used even in tough applications such as on a machine that requires five matched pairs of chucking jaws.

Metals:

Bath quickly strips plastisol from steel

Only four minutes immersion in an oxidizing molten salt bath completely strips 2¼ lb of tough, tenacious plastisol from steel baskets. This is accomplished by the Kolene process, the basis of which is a patented salt formula. It is used in an insulated pot surrounded by an outer steel shell.

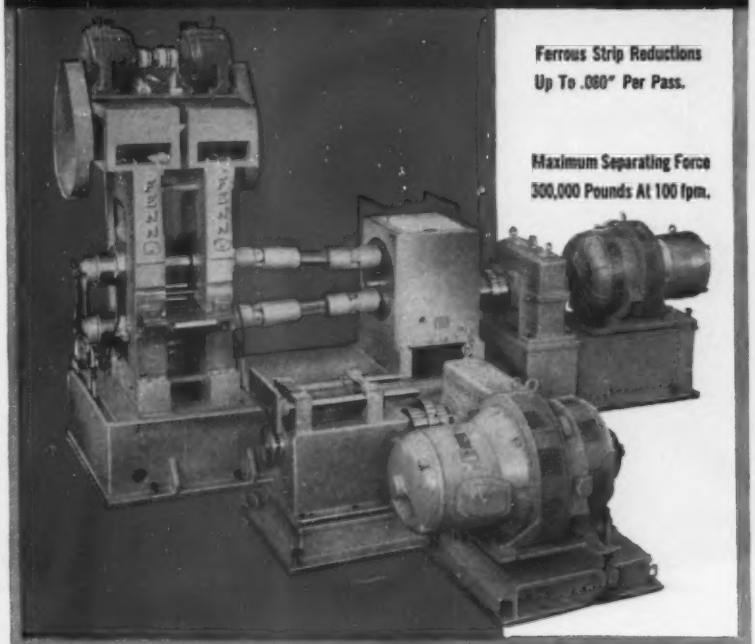
Overhead Crane Used

Baskets are lowered into the bath by an overhead crane, then transferred to an adjoining water-

FENN INTRODUCES A . . .

NEW LARGE

LABORATORY ROLLING MILL



PERMITS HEAVY REDUCTIONS IN THE LABORATORY ON FERROUS STRIP

Fenn's new Model 4-083 Combination Type Laboratory Rolling Mill, a companion to the popular smaller Fenn Mill, is capable of taking heavy reductions on ferrous strip at all speeds between 100 fpm and 500 fpm. The mill (2½" x 8⅜" x 8") can be used as a two-high mill, or as a four-high mill featuring driven back-up rolls or work rolls, and many drive combinations are possible to meet customer specifications. Important features of the new mill include a dual motor power screw-down unit, force feed lubrication system, and auxiliary operator control stations.

FENN

COMPLETE MILL SPECIFICATIONS
sent upon request.
Fenn engineering service is available to help you solve your rolling problems.

FENN MANUFACTURING COMPANY, 307 FENN ROAD, NEWINGTON, CONNECTICUT

furnace treated

Have you fully investigated the cost-saving advantages of furnace treated cold finished steels? For a number of years WYCKOFF has been saving time and money for industry's leading buyers through highly specialized pre-treatment of steel to produce exact and unvarying working characteristics.

One of our metallurgists will be glad to discuss this service as applied to your production requirements.

PRODUCTS

Carbon, Alloy and Leaded Steels • Turned and Polished Shafting
Turned and Ground Shafting • Wide Flats up to 14"
All types of furnace treated Steels

WYCKOFF STEEL COMPANY

GENERAL OFFICES:
Gateway Center, Pittsburgh 30, Pa.
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WORKS AT:
AMBRIDGE, PA.
CHICAGO, ILL.
NEWARK, N.J.
PUTNAM, CONN.

rinse tank after stripping. Residue settles into a removable sludge pan at the base of the pot. Average weight of the coated baskets is 12¾ lb. They hold various small parts for acid dipping in the plating operation of a Detroit manufacturer.

When the plastisol deteriorates in use (such as in acid pickling, plating, material handling etc.) the baskets are stripped and recoated.

Other Attempts Unsatisfactory

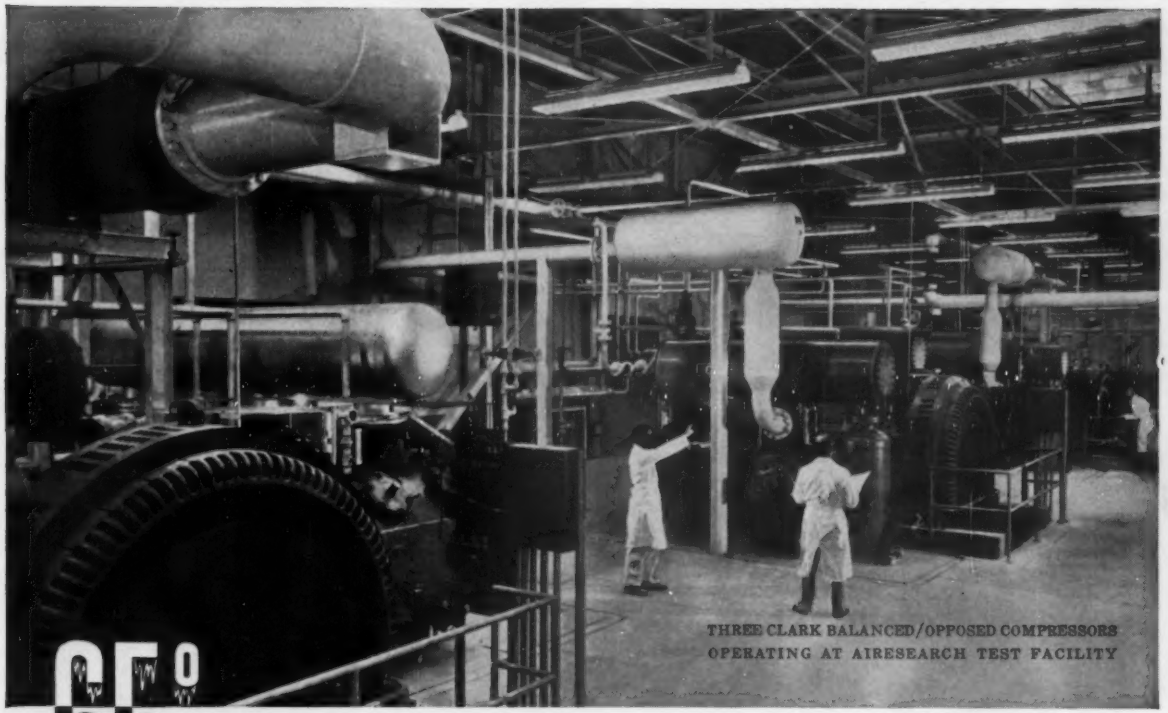
Prior to the very recent adaptation of the process, a succession of unsatisfactory attempts at stripping proved time-consuming and costly. Flame treatment was hazardous, distorted the baskets and caused temper loss of the metal; the plastisol was unaffected by sand blasting and other manual cleaning methods consumed hours instead of minutes. Designer and engineer of the stripping process is the Kolene Corp. of Detroit.

Baskets are lowered into the bath by overhead crane.

Heat Treating:

Gas blowers supply oil-free atmosphere.

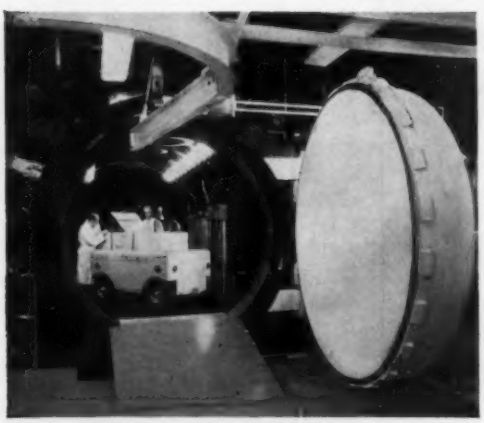
To prevent oxidation during its annealing processes, an eastern steel company employs a specially prepared reducing atmosphere. The atmosphere is supplied at



THREE CLARK BALANCED/OPPOSED COMPRESSORS OPERATING AT AIRESEARCH TEST FACILITY

65° below zero in the middle of the desert

Clark Air Compressors furnish the power



GIANT ALTITUDE CHAMBER FOR HOT AND COLD TESTS

Mass production testing of aircraft components such as air turbine starters, refrigeration turbines and other units was what the AiResearch Division of the Garrett Corporation wanted. To meet this need, they built giant test facilities next to their factory in the middle of the Arizona desert at Phoenix featuring seventy-five test cells.

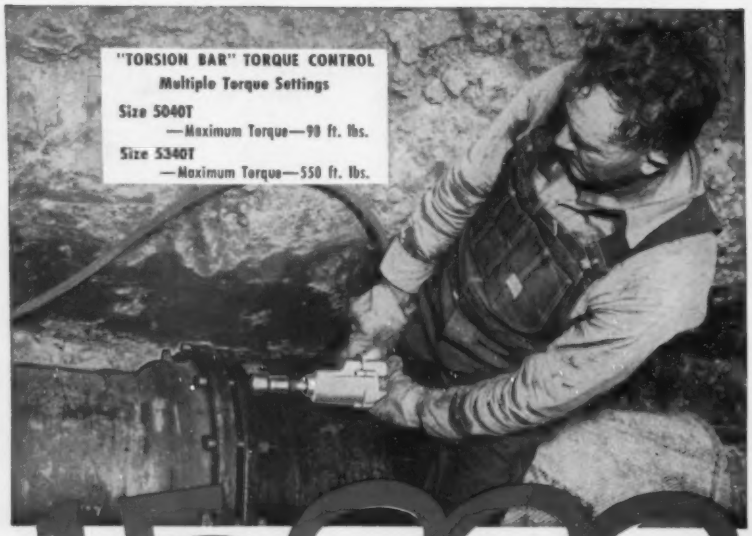
To provide most of the air to operate test equipment AiResearch installed three Clark Model CRA-4 Balanced/Opposed Motor-Driven-Compressors having a combined rating of 4750 horsepower. Up to 42 tons of air per hour can be delivered. Temperatures range from a frigid −65° to a blistering 1000°F while pressures of from vacuum to 1000 psi can be provided.

For your air needs in the 150-4500 horsepower range, Clark has an ultra modern Balanced/Opposed Compressor to fit every application. Your nearest Clark representative will give you complete information or write for Bulletin 118.

CLARK BROS. CO., OLEAN, N. Y.
One of the Dresser Industries
Offices in Principal Cities Throughout the World

CLARK®

Balanced/Opposed Air Compressors



15,000

3/4" bolts uniformly tightened to 60 ft. lbs.

TORSION BAR with new Ingersoll-Rand

Torque Control IMPACTOOL

PROBLEM:	Assembly of 1390 mechanical pipe joints involved over 15,000 3/4" bolts. The problem was to speed assembly, remove guesswork and assure proper tightness of all joints.
AIR ENGINEERING SOLUTION:	A new Ingersoll-Rand Size 5040T Torsion Bar Torque Control Impactool, preset to deliver 60 ft. lbs., was put on the job.
RESULT:	The Torque Control Impactool automatically shut off at the preset Torque . all guesswork was eliminated . . . uniform joint tightness was produced . . an average of 10 minutes per joint was saved . . . smaller bell holes were required due to compact size of the 5040T . this one tool produced an extra profit of $404.25 on this job.

You can put these new "Torsion Bar" Torque Control Impactools on your nut running jobs and reap these benefits: Positive Torque Control . . . Simple Torque Setting . . . Setting remains constant . . . No pressure regulators needed . . . No operator training.

Write or phone for a free demonstration of this revolutionary fastening development.

Ingersoll-Rand

8-344

11 Broadway, New York 4, N.Y.

pressures ranging from 4 to 10 psig by seven gas blowers. Each has a capacity of 400 cfm.

It is most important to prevent contamination of the prepared atmosphere gas by lubricating oil. Oil free gas is assured by the construction of the blowers. These are manufactured by Read Standard Corp., York, Pa.

Blowers Compress Gas

The rotary blowers compress gas in the pockets that form between male (lobed) and female (grooved) rotors during the cycle of rotation. The rotors are each 11 in. long and are on parallel shafts with a center-to-center distance of 4½ in. They are encased within a one-piece housing, which has ports for inlet and outlet diagonally disposed on opposite sides. Since there is no actual physical contact at any time between the rotor lobes, housing or end closures, no internal lubrication is required, and the gas is not polluted by contact with grease or oil.

This 400 cfm gas blower helps circulate the atmosphere.

Leakage Reduced

Leakage loss is held down by maintaining clearances on the order of a few thousandths of an inch between the meshing rotors, housing and end closures. Labyrinth seals are employed to restrict the leakage by throttling the compressed gas through a number of parallel grooves. These grooves, of very small clearance, are formed between the seal bushing and the grooved bearing spacer on each rotor shaft.

Joining:

Silicon coating improves soldering connections.

Coating of printed circuit boards with a silicon solution assures better soldering connections for electrical components. The silicon coating is used by the Westinghouse Corp. It is applied by a silk screen process similar to the one used in transferring the printed circuit pattern itself.

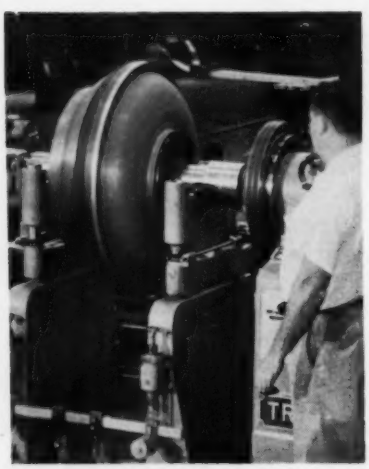
Strong, Durable Connections

By repelling the 550° heat of the solder pot into which the board is dipped, the heat resistant silicon forces the solder toward the component connections. The result is selective soldering which concentrates the solder in the desired areas to form strong, durable connections.

Power:

Aluminum torque converters provide stepless transmission

Lightweight aluminum torque converters bring advantages of fluid-drive power transmission to engines and motors of many sizes.



Parts undergo rigid tolerance tests before being installed.

National Supply Co. produces six basic types of torque converters with 17 power capacities at their Toledo, Ohio, plant. Each

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8-343

Ingersoll-Rand

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consists of three or more sets of precision-cast aluminum alloy elements. These afford a smooth transfer of power from engine to equipment through an oil-filled medium. These elements, pump, turbine, and stator, are all close-tolerance products of Alcoa's Cleveland works.

By making possible a "stepless" transmission, the torque converter eleminates continual clutching and declutching on engines which power machinery. At the same time, it compounds the engine's power output and automatically adjusts it to changing loads.

Fabricating:

Junction boxes eliminate special fabricating.

An extensive 24,000 ft underfloor wiring system installed in the new scientific crime detection laboratory of the Ontario Provincial Police, Toronto, posed quite a problem for the electrical constructors. With only six full-time electricians,

Extra thin ductwork runs beneath the concrete floor.

they had to wire a building to accommodate an abundance of electronic equipment, an intricate buzzer system and a communications network.

Solving the Dilemma

With renovation plans calling for only 1½ in. of concrete surfacing, the job required ductwork smaller in depth than the standard raceway. National Electrical Products Corp.'s newest product, Flushduct, was used to solve the dilemma. Although similar to a standard raceway, it is only 1⅜ in. deep.

No drilling, no concrete cutting and very little on-the-job fabricating was necessary.

Unusual Installation Feature

An unusual feature of the installation is the liberal use of junction boxes. This eliminated need for specially fabricated conduits and, the installers report, reduced concrete undercutting by 20 pct. The junction boxes are two piece castings with partitions and crossbars incorporated for separation of high and low potential compartments. All electric services carried in the ducts are accessible through the removable top.

Steelmaking:

Pilot plant casts billets at 200 ipm.

Mild steel billets of commercial quality are now being produced in a British pilot continuous casting plant at speeds in excess of 200 ipm. This is the equivalent of 7 ton of 2 in. square steel billets per hour.

Carbon, Alloy Steels Melted

Carbon and alloy steels for continuous casting are melted down and refined in a five ton electric arc furnace in use at the Barrow Steel Works, Ltd., Sheffield, England. After tapping, the ladle of molten steel is teemed into a tundish at the top of the continuous casting plant. The steel then flows at a controlled rate into a reciprocating water-cooled copper mold. A partly solidified billet, its central core still liquid, is withdrawn from the bottom of the mold. Solidification is completed as the billet, preceded by a dummy billet, travels vertically down the machine. When it emerges in solid form, the continuously cast billet is cut to the required lengths.

Casts Stainless Steel

The Rossi-Junghans pilot plant at Barrow is capable of producing

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Capri, 917 Woodland Av
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Chinalane, 1739 Euclid Av
Coach House, 3102 Mayfield Rd
Damon's, 2466 Fairmont Blvd, Cleveland Hts
*Gate-Way Motel, 29865 Euclid Av, Wickcliffe
Gruber's, 20120 Van Aken Blvd, Shaker Hts
Guarino's, 12309 Mayfield Rd
Hickory Grill, 929 Chester Av
*Hollenden Hotel, 610 Superior Av
Jim's Steak Hse, 1800 Scranton Rd
Kathe Kreuzer's, 32045 Detroit Rd, Avon
Kluck Bros, 1313 W 117
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Little Ted's, 1356 Ontario
Luccioni's, 4213 Euclid Av
Maharas, 8817 Wade Park Av
Monaco's, 1118 Chester Av
Pierre's, 1524 Euclid Av
Playhouse, 1415 Euclid
Robinhood Inn, 16026 Mad Av, Lakewd
Roman Gardens, 12207 Mayfield Rd
Russo's, 10309 Euclid Av
*Saddle Inn Rest & Motel, Hwys 2 & 6, Avon Lake
The Shaker Steak House, 3941 Warrensville Center Rd, Shaker Hts
Shaker Tavern, 13051 Larchmere Blvd, Shaker Hts
Sherwood Inn, 425 Euclid Av
Sky-Way, 4998 Rocky River Dr
Sonnhalter's, 5505 Euclid Av
Tavern Chop House, 1027 Chester
Theatrical Grill, 715 Vincent
Town & Country, 16201 Kinsman & Lee, Shaker Hgts.
Wagon Wheel (French Cuisine), 13114 Woodland Av
Webers, 242 Superior Av, NE
Zephyr Room, 16706 Kinsman Rd, Shaker Hts

*Rooms may also be charged

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DEVELOPMENTS in APPLIED RADIATION ENERGY, its APPLICATIONS and the APPARATUS USED TO PRODUCE IT

SUBSTANTIAL SAVINGS in time and money are being gained with circumferential radiography — a technique exploited by the unique features of the Van de Graaff supervoltage x-ray generator.

Instead of requiring separate exposures for many segments of a circumferential weld, the Van de Graaff's sideward-directed x-rays radiograph the entire seam *in a single exposure,* with excellent film density and sensitivity. Because of the very small focal spot, sharpness is retained even where short object diameters are involved.

The wide x-ray coverage of the panoramic beam is used with equal benefit in simultaneous radiography of groups of castings arranged in a circle; *only one exposure is required* to inspect a number of objects. Production radiography in applications previously considered impracticable results from Van de Graaff's speed and versatility.

For a complete analysis of the advantages of supervoltage radiography with the Van de Graaff, including case histories from American industry, write for our 24-page Bulletin R.

HIGH VOLTAGE ENGINEERING CORPORATION

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billets from 2 to 4 in. square and slabs of up to 6 x 2 in. in cross-section. Satisfactory results have been achieved in the continuous casting of mild steels, low alloy steels, and stainless steel. In subsequent manipulation, the continuously cast carbon steels have been found to have good forging characteristics, while high quality sheets have been rolled from continuously cast stainless slabs.

Experiments are continuing with a view to establishing a satisfactory process which will be both economic and repetitive.

Controls:

Jig borer's spacing accurate to within 5/100,000 in.

Machines with built-in measuring systems produce accurate spacing within 5/100,000 of an inch. General Electric's Small

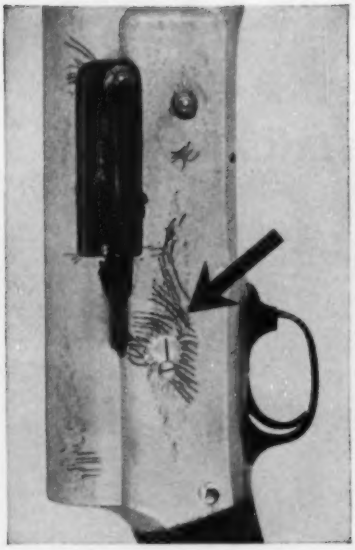
Highly accurate spacing is performed with this unit.

Aircraft Engine Dept., Lynn, Mass., uses this Linder jig boring machine to manufacture high quality precision control parts for its small gas turbine engines.

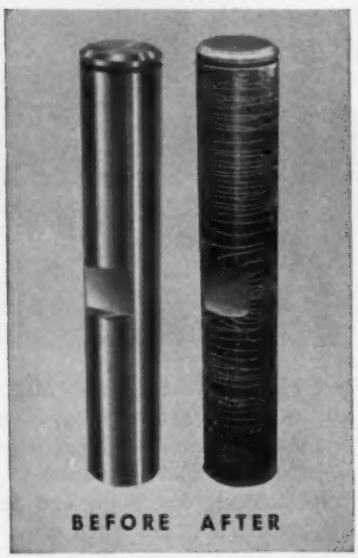
Accurate Spacing Achieved

After determining the desired length between points where holes are to be drilled, the machine's optical measuring system takes over and assures accurate spacing, reflecting the measurements on a screen by means of a photoelectric indicator.

Case Studies: TESTING METHODS



Stresscoat is a Magnaflux developed brittle lacquer coating for testing and measuring stresses in working parts and designs. Stress analysis is providing new ways to reduce the cost and weight of products to make them stronger, better and cheaper.



Inspection with fluorescent Magnaglo under black light reveals cracks as glowing danger signals impossible to overlook. Magnaglo increases the speed of inspection and makes it easy to spot and identify defects in keyways, threads and other hard to see places.

"GOOD TURN" INSURANCE pays off for the Todd Shipyards Corp., Brooklyn, N. Y. A portable Magnaflux unit is used to inspect for cracks in keyed taper of an 18" propellor shaft of one of the giant ocean-going vessels.

Extra Savings in Both Manufacturing and Preventive Maintenance Inspection

M methods pay "extra" dividends when used to inspect the products you make. These testing methods help pinpoint early defects in forgings, weldments, castings, bar steel and other component parts in the "rough" or finished state. It enables you to take corrective steps to eliminate their cause in the production process. You save the time, money and materials usually lost by processing defective parts and excessive scrap. By clearly showing the extent and seriousness of defects, M methods provide added benefits from salvage operations.

A "safety" bonus can mean more than dollar savings in a preventive maintenance inspection program. Early detection of fatigue cracks in a crane hook can prevent an accident which could cost lives as well as money. Magnaflux offers many complete, easy, quick, portable methods for "in plant" or "in the field" inspection of machinery and equipment.

Consider for a moment, the many ways M test methods can help you save "extra" in your present operations. Consult your Magnaflux engineer for specific information and examples of how M can help you produce better for less!

"Conveyorized" Magnaflux inspection is engineered for jet engine production line. Jet engine vanes are inspected at the rate of 5,000 or more a day. First step is magnetizing vanes. Conveyor moves vanes into inspection booth (above) where inspector watches for any accumulation of magnetic particles indicating longitudinal defects. After passing through a second ferro-magnetic bath and longitudinal magnetic field, vanes are inspected for transverse defects. Then they move automatically through a de-magnetizer.

HALLMARK OF QUALITY IN NONDESTRUCTIVE TEST SYSTEMS

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Write for complete details concerning any of the above case studies, (excerpts from MAGNAFACTS), or ask for our new booklet on Lower Manufacturing Costs.

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ATLAS

ROLLER CHAIN AND SPROCKETS

THE IRON AGE | SPECIAL FEATURE

HOW TO GET MORE FOR YOUR METALWORKING DOLLAR

Number 6 of a series

INSPECTION

September 27, 1956

How To Get More For Your Inspection Dollar

Quality control, as a method of management, depends upon inspection for its implementation. It is inspection that turns any quality control system into tidy profit—or additional overhead. But what kind of inspection and how much? Obviously, there can be no standard answer to every inspection problem in the metalworking industry. But there can be a logical approach.

Start with organization—the kind of inspection organization that fits your operations comfortably, efficiently. Then consider personnel requirements, standards, equipment, the types of inspection you can't afford to be without.

This feature, aimed at making your inspection dollar make even more sense, covers virtually every facet of inspection that realy counts.

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Salvage

Objectives

Why Inspection Counts

◆ IN AN INDUSTRIAL community devoted to efficiency and quality improvement, the inspection function continues to gain in importance. Such a trend is both normal and healthy.

It is hard to conceive of valid productive efficiency devoid of considerations of product quality. It is equally difficult to picture a well-ordered system for maintaining quality standards without some form of imposed "control."

Together, the system for quality maintenance and its mode of operation comprise the quality control and inspection functions. Quality control may be considered a method of management. Inspection directly implements that method, transforms guiding principle to working reality.

No one will argue that a system designed to maintain and promote product quality is without inherent merit. Such a system is an essential part of the management function. It guarantees a dependable and, therefore, salable product. But to be satisfactorily workable, an inspection system must be fitted to overall operations—at a price.

Too much inspection is extravagance. Too little can be catastrophic. So that getting the most for your inspection dollar must equate inspection costs with both product quality requirements and overall operations.

To be worth its salt, the inspection function must remain completely objective. Ultimately, it cannot tolerate either expediency or personal whim.

To achieve and retain objectivity, it must comprise at least three essentials. It must have a well-defined goal. The operating details for achieving this goal must be spelled out in definite quality standards. These standards, in turn, must be evaluated and enforced by competent personnel sufficient in numbers to provide a complete service.

Start With A Plan

It is probable that every type of manufacturing enterprise makes use of some quality standards, whether defined or merely implied. Manufacturing standards—even of a slipshod variety—tend to provide some element of control. And to whatever extent these standards are enforced, the inspection function is operative.

But there are almost as many types of manufacturing enterprise as there are products.

ULTRASONIC testing is relatively new and gaining in popularity. It can detect flaws and other defects in heavy sections non-destructively.

They range in size from the very small to the gigantic. Their personnel may be numbered in the tens, the hundreds, or even the tens of thousands. Under these conditions, is it possible to propose an inspection technique that will fit all requirements, adjust to every variable?

A distinguished mathematician once observed that a principle must be extremely simple if it is to dominate a multitude of diverse problems. Anything too complex, he reasoned, tends to get lost in a lather of qualification. This observation applies particularly well to the functions of inspection and quality control.

The prime objective of quality control is to support and, wherever possible, to improve the quality of the product. As part of its own justification for being, it must adjust to competitive standards common to an industry. To help pay its way, it must be intent upon the systematic reduction of waste.

When applied to the metalworking industry, these few principles must be suitably fitted to the needs of the makers of hairpins and bottlecaps as well as to those of the manufacturer of the most complicated machinery ever devised. The interest of the metalworking industry in the maintenance of product quality is not restricted to a few particular products.

In actual practice, however, it is obvious that the need for the more elaborate inspection system is far from universal. Elaborate systems are most readily justified where the cost of even a single "reject" is high. As defined by one expert, the value of the inspection function "increases with the ratio of the cost of waste to the total cost of the product."

If there is a rule-of-thumb for determining how much inspection constitutes "too much," it is very likely a mixture of common sense and everyday economics. A few typical examples illustrative of the relatively simple and the highly complex product may serve to underline the significance of this highly sensitive balance.

When the Product Is Simple

Let's assume your product is a simple bottlecap, stamped and formed from steel strip. If all of your product is made to fulfill specific contracts agreed to *prior to* production, your anticipated expenditures can be readily calculated. A relatively small percentage of total cost may be allocated to inspection. Because the percentage is so small, it must be used with considerable judgment and care.

It would be unwise, for example, to aim your inspection expenditures directly at the finished product. This would imply checking each finished bottlecap for thickness, overall dimensions, breaks and tears, and surface finish.

Not only would such a system of checks be overwhelmingly time-consuming and costly, but it would lack the machinery for anticipating rejects before they actually occur. With a relatively simple product of low unit cost, *avoiding* rejections is probably the major responsibility of the inspection function.

In the case of the bottlecap, the bulk of the inspection effort should be aimed at the determinants of end product quality rather than at the end product itself. These determinants would be: 1) the raw material from which the cap is made and 2) the tooling required to stamp and to form the cap. Should either the base material or the tooling be faulty, rejection of the end product is virtually a foregone conclusion.

One other important qualification should be kept in mind. Whereas the cost of the bottlecap produced under contract for a known customer can be reasonably well calculated in advance, this same condition may not apply to bottlecaps produced speculatively—for sale in the open market.

Speculative production is apt to be a little more complicated if only because it requires keeping an even keener eye on the competitor's product. The competitive aspect may, on a moment's notice, call for further tightening or relaxing of product standards. In either case, the product must remain competitive. This day-to-day requirement might further qualify allowable expenditures for inspection.

A more complex product, involving both part fabrication and unit assembly, will very likely require and justify a more elaborate inspection system. The inspection function may have to be skillfully spread to cover the control of incoming materials, in-plant processing, and final or finished-part inspection. It may also require additional inspection machinery for the disposition of doubtful or borderline cases.

All of which adds up to the first rule for getting the most for your inspection dollar. Simply stated, it calls for the determination of how much inspection, in the quantitative sense, is actually required. The nature of the product, operating costs, competitive standards — all contribute importantly to a satisfactory answer.

This quantitative measure of the amount of inspection required can provide a firmly realistic basis for an inspection plan.

After the master plan for adequate quality control and inspection is decided upon, there still remains the job of putting it to work. Preferably, the plan adopted should blend with existing operational procedures and manpower. It should not be slipped over an organization like a tight-fitting shoe.

Ehrhardt Tool & Mach. Co.

GAGING is an essential part of many inspection techniques. Here, the operator checks diameters on precision test saddles.

Bear in mind that the plan requiring excessive compulsion for its enforcement is very likely to be the wrong plan.

Similarly, as most experts agree, a good inspection plan should follow in the steps of normal production flow and scheduling. If manufacturing procedures have been organized in reasonable sequence, there is no logical justi-

Check Modern Inspection Tools:

1) Air gages
2) Magnetic particle inspection
3) Ultrasonics
4) X-ray radiography
5) Gamma-ray radiography
6) Spectrographic analysis
7) X-ray diffraction
8) Electron diffraction

fication for extensive alteration. On the contrary, the success of an inspection plan is more likely to be assured if it readily conforms with existing production routines.

If a production line originates at the receiving platform for incoming materials, such location is also the most logical point of origin for inspection procedures. Set up an inspection crib for all incoming materials and locate it as close to the receiving platform as is feasible.

Tips on Rough Inspection

Few plants, if any, ever tend to overemphasize the incoming materials inspection function. Some are inclined to sell it short. This can be a costly error. For while this branch of inspection is certainly not the "tail that wags the bull," it is still a tail the bull can't afford to shed.

The inspection of incoming materials operates under a number of aliases and covers a lot of territory. In some plants, it is referred to as "receiving" inspection. Others prefer "rough" inspection. By whatever name, however, its normal responsibilities include the inspection of all incoming raw materials, semi-finished articles, and tools. If the work load permits, it sometimes handles the inspection of parts and assemblies received from subcontractors.

In a metalworking plant, incoming materials inspection would be expected to check the condition of such items as bar stock, rough forgings, castings, sheet and strip, lubricants and acids, and other basic materials of production.

The name "rough inspection" fits the operation rather well because the checks it is expected to make are essentially straightforward and relatively simple. It is a "quick and dirty," rather than a laboratory-type, operation. This should not be taken as criticism, since the simplicity of its functions constitutes a prime asset.

Remember that in the case of rough inspection, it is the combination of speed and simplicity that expedites transfer of raw materials to the production floor. This is the curtain raiser that precedes the main show—if the show is going on at all.

Checking purchase orders, counting, sorting, measuring, detecting damage, labeling, and routing are some of the functions included in the rough inspection routine. Unless it is charged with the responsibility for checking subcontractors' semi-finished parts or assemblies, the fanciest test normally performed by rough inspection is a simple hardness check.

Whenever doubt exists as to the proper disposition of incoming materials, the matter is usually referred to a higher authority—preferably the inspection or metallurgical laboratory.

Timken Steel & Tube Div.

NOT EXACTLY an innovation but still relatively new is the direct reading spectrometer. Steel plant obtains spectrometric analysis in 35 sec.

Some sort of systematic check on incoming materials is obviously essential in any manufacturing operation. But the special virtues of a good rough inspection setup are considerably more subtle. In fact, they are frequently overlooked.

The routine matter of Brinell hardness checking rough steel forgings at the time of delivery is a typical example. As received, such forgings are usually—or at least should be—in the annealed or semi-annealed condition. Their hardness should be low, since they are to be machined prior to final heat treatment.

By accepting only those forgings that fall within the proper hardness range, rough inspection is helping to avoid a number of costly headaches. It is helping to avoid tool problems and improper machining on the production floor. It is also guaranteeing that the forging is in suitable condition for subsequent heat treatment. Within certain limits, the same routine hardness check also serves to detect forgings with excessive decarburization.

To maintain maximum speed with a minimum of equipment and personnel, incoming mate-

Pointers For Selecting a Quality Control Plan:

1) **Determine minimum quality standards required in terms of end product.**

2) **Make sure this minimum can match competitive practice.**

3) **Choose standards that are compatible with product design.**

4) **Remember that your plan must fit the average skills of your working force.**

5) **Choose a plan that is consistent with your production equipment.**

6) **Bear in mind the types of inspection equipment you have on hand and can afford to purchase.**

7) **Remember that a plan that requires excessive compulsion for its enforcement is likely to be the wrong plan for your organization.**

rials inspection cannot afford "screening" techniques. "Screening"—although sometimes justified—calls for 100 pct inspection. It is time-consuming and expensive and, oddly enough, does not positively insure elimination of all defective material.

Sampling or lot-by-lot inspection, it is generally agreed, is a better bet. In line with this technique, rough inspection checks a few samples from each incoming lot of material. Acceptance or rejection of the entire lot is based on the sampling.

Obviously, this technique is not fool-proof. It has been known to produce "sampling errors," where an entire lot has been mistakenly accepted or rejected on the basis of a few non-typical samples. Fortunately, statistical probability comes to the rescue in helping to keep sampling errors to a minimum.

Rough inspection—as well as every other division of the inspection function—must depend on standards to guide not only its inspection decisions but also its procedures. Although the larger manufacturing operation may be in a better position to bear the expense of preparing written standards, the smaller establishment can seldom afford to be without them.

Work with Standards

Not all small manufacturers go along with this view. More than a few delude themselves with the honeyed notion that being small somehow provides guaranteed immunity from standards. This is possibly a moral, but not a sound engineering, approach to the problem.

The unfortunate experience of a small heat treating shop provides a dramatic example of why trying to operate without written standards is not likely to pay off—even for the very small establishment. This particular shop was begun by two partners who, for a number of years, comprised the entire management, sales, and production force.

For a long while, they built their little business on "non-specification" work exclusively. They heat treated all manner of odds and ends for other small shops who, like the heat treaters, were not in a position to carefully check the quality of their work.

Frugal, they invested their money in additional heat treating equipment — carburizing and nitriding furnaces, a couple of new salt baths, and even an induction heating unit. The new equipment added credence to the notion that they knew what they were doing. Eventually, they convinced themselves that they were ready for the "big time."

As fate would have it, they bid for, and landed, a lucrative defense contract. The out-

BLUEPRINT, micrometers, and inspector at work—an everyday combination in metalworking plants. Inspectors combine accuracy, tact, judgment.

Ehrhardt Tool & Mach. Co.

OUTSIDE diameters of shank and sleeve of an expanding mandrel for assembly of motor stators must be accurate to within 0.0003 in.

look was never brighter. They even managed to bluff their way past the qualifying process inspectors, largely because so much of their equipment was brand new and in top operating condition.

But the axe fell with the very first order they tackled: 4,000 small gears to be carburized in accordance with stringent specifications. Knowing no more about specifications than Idaho potatoes, they managed to produce 4,000 scrap gears beyond the point of salvage.

In time, they received a bill—not a check—for $32,000. That same day, they decided to hire a metallurgist and set up a system of standards. Luckily, they awoke in time to survive and are still in business. But it was a mighty close call—thanks to their estimate of the importance of standards.

If it is agreed that both large and small establishments need written standards for the proper implementation of the inspection function, it does not necessarily follow that both need all of the same types of standards for successful operation. Nor is it essential that the types of standards be equivalent in detail and degree of complexity.

To this extent, standards should mirror the size and complexity of the organization for which they are designed.

One authority suggests that the bulk of inspection standards can be classified under five headings. First, there are those standards that define policy and procedures at the interdepartmental level.

Standards Aid Manufacturing

Such standards cover all departments—inspection, engineering, production, sales. Essentially, they spell out the ground rules for interdepartmental r e l a t i o n s and define the specific responsibilities and functions of each department.

A second set of standards applies to the operating policies and procedures of the inspection department alone. These standards treat in detail such matters as departmental organization, job classification, expenditures, the keeping of records, inspection methods, gages and instruments, and procedures for salvage.

In scope, they must be sufficiently broad to cover both the daily routine and the occasional emergency. Although clearly defined, they must not be wholly inflexible. Most important, they should reflect the organization for which they are prepared—its size, its personnel, its existing facilities.

A description of specific methods to be used in inspecting constitutes a third set of standards. The prime purpose of these standards is to provide the inspector with written instructions for each inspection operation. They can be used to advantage in almost any manufacturing setup, regardless of size.

Remaining sets of standards pertain to recommended repair practices and the standardization of replacement or interchangeable parts. Repair standards can save a lot of valuable shop time by describing the limits of allowable repairs and specifying the methods by which repair must be accomplished.

Design standards for interchangeable parts help to avoid needless engineering work. They apply primarily to components or designs that can be used over and over again, regardless of model changes. Standard threads and fits, nuts, bolts, and pins, keyways and oil holes are typical examples.

Many of the standards will concentrate on

what is usually inspection's largest job: the maintenance of quality and the elimination of waste on the production floor. Because an overwhelming percentage of the metalworking industry's output entails fabrication, this aspect of the inspection function is likely to gain most attention.

Manufacturing inspection can be a tremendously varied order. Depending upon the end product, it may take under its wing dozens of distinct manufacturing processes. Some of the better known operations include machining, forming, stamping, welding and other means of joining, heat treating, electroplating, polishing, and painting.

The objective, of course, is the finished part. Each component must be made to clear a variety of hurdles in processing in order to be acceptable at final assembly.

This, at least, is commonly the view of the manufacturing manager. He knows from experience that the more numerous the processing operations for any given part, the greater are its chances for rejection.

Keep Inspection Positive

The view of the inspector is not quite the same. Statistical probability tells him that there are likely to be some rejections. But an important part of his job is to catch the rejection as close to the beginning of the manufacturing sequence as possible.

The further a part is from completion, the better are the chances for its salvage. If its condition is such that it must be scrapped, the fewer the manufacturing operations performed on a scrapped part the better from a cost standpoint.

The manufacturing camp is always intent upon "getting the job out." Numbers are the important thing. The inspection camp supplies the brake. Numbers, yes, but with a consistent level of quality.

The inspection function would be entirely negative if it did nothing more than search about for possible defects as bases for rejection. Such is not the case. Manufacturing inspection is always charged with the responsibility of explaining the cause of the defect and recommending means for its elimination.

To fulfill this obligation, manufacturing inspection is normally granted access to the skills and knowledge of all branches of the engineering department. Corrective action, when determined, is always called to the attention of manufacturing supervision.

Manufacturing inspection combines the conditions of mobility and immobility common to production processes. It is capable of moving about as required, but it also provides for standing still in a central location on the production floor long enough to gather the moving ends, correlate functions that might otherwise grow apart.

In essence, this is what the terms "flow" and "central" inspection imply, insofar as they are applicable to manufacturing operations.

Earlier systems of inspection did not always take into account the all-important characteristic of mobility. Modern practices emphasize this aspect. Not only do they more closely mirror manufacturing operations, but they also contribute to the improvement of production rate. They actually promote the reduction of per unit labor cost.

Other costs are reduced as a by-product—especially those due to rework and scrap. Modern inspection provides continuity—essential to production—by inspecting on the run.

Parts rejected by manufacturing inspection are frequently tagged for rework or salvage. Until such parts are properly brought within standards, however, they constitute a hazard on the production floor. There is always the chance that they will be mistakenly returned to the regular production flow.

The surest way of guarding against this danger is to provide a separate area, preferably enclosed, for the accumulation and storage of all rejected parts pending final disposition. Assignment of parts for rework should originate from this area. Parts that must be scrapped should be distinctly marked and then damaged beyond the point of possible use.

Ultimate decisions as to what parts can or cannot be salvaged should be made jointly by a committee representing inspection, manufacturing, and engineering. In those cases where complete agreement cannot be reached by all members, the advice of the engineering department is wisely given priority.

Receiving Inspection's Job:

1) **Checks all incoming material against purchase orders.**

2) **Counts and sorts materials received.**

3) **Detects damage to incoming materials and reports it to proper authority.**

4) **Performs routine checks—such as hardness testing—as required.**

5) **Properly labels incoming materials and routes them to designated location.**

Types of Organization
Basic Duties
Human Aspects
Personnel Standards
Job Analysis
Role of Judgment
Mensuration
Equipment

Organization

Equal Status Is Essential

◆ THE INSPECTOR'S JOB often calls for extraordinary tact. It is understood that there may be times when his actions, as dictated by his duties, will not win the plaudits of the rank and file. And despite the virtues of organizational harmony, this inherent potential for conflict is largely unavoidable.

Throughout all of the stages of interdepartmental war and peace, it is essential to recognize the inspection department for what it is —management's front-line representative for the preservation of product quality. As a management function and as a department, it should be organized accordingly.

If its place in a company's structure is not to be compromised, it must enjoy equal status with other important departments—especially engineering and manufacturing. Its internal organization must be carefully planned.

That any attempt to subordinate or compromise the inspection function is likely to destroy the department's usefulness, should be fairly obvious. But obvious or not, such attempts still persist.

Making the inspection department subordinate to manufacturing constitutes the most popular version of "how it's done." Of course, this bit of sleight-of-hand—even when managed by the most skillful practitioners—never quite comes off as anticipated. Expecting that it should is comparable to expecting lead to float on water.

There are at least three distinct approaches to the organization of an inspection department. The weakest of all is that which sets up inspection in an advisory capacity to both engineering and manufacturing. Stripped of any real authority, the department speaks only when it is spoken to—and then in a quavering voice.

Give Inspection Muscle

An advantage claimed for this arrangement is that it tends to minimize possible friction between manufacturing and inspection. No doubt, it must. But to accomplish this condition of peace and harmony, it divests the inspection function of any real usefulness. In practice, it is reasonable to expect that such an inspection department would quickly dwindle to little more than a name on the company's books.

A second approach calls for the organization of a full-fledged inspection department

with ultimate authority over all aspects of the inspection function. In this case, the inspection department is on equal footing with other major departments. Its chief officer reports directly to the company's general manager.

This approach does more than supply the inspection function with a full set of teeth. By placing full responsibility where it rightfully belongs, it endows the department with the incentive to produce—to really pay its own way.

Plan Inspection Functions

If this system is subject to possible pitfalls, it is seldom the fault of the system. Almost always, the fault can be traced to the actions of individual personnel. Such actions can stem from a misconception of inspection's true functions and responsibilities.

A third organizational approach is a somewhat magnified version of the second. It calls for elevating the inspection function to the policy-making level of top management. Under this plan, the chief inspection officer is an officer of the company.

This plan could have certain advantages that are not attained by the second plan. But where such advantages do exist, they are not likely to derive from any innate attribute of the plan. They are more likely to depend on the specific nature of the company involved, its background, and its personnel. It is largely a question of "on you it looks good."

For all practical purposes, therefore, plans 2 and 3 can be considered identical. In both cases, the inspection function is contained in a single, fully authoritative entity.

Starting at the top with a chief inspector, how are the inspection functions normally subdivided? One widely accepted organizational plan involves three distinct subdivisions, each managed by an inspector who reports directly to the chief inspector.

This plan assumes that the total inspection function comprises 1) examination and testing, 2) administration and planning, and 3) analysis and research.

Examination and testing is charged with the responsibility for all routine inspection. This normally includes "rough" inspection, inprocess inspection, and the inspection of final assemblies or finished parts.

Where the nature of the tests is essentially routine, it also controls the inspection of out-of-plant production sources and conducts all acceptance tests. It is directly responsible for physical equipment—tools, gages, testing machines, and similar instrumentation.

Administration and planning, as the title implies, is responsible for maintaining all of the organizational aspects of the inspection department. It handles personnel procurement, training and placement, systematizes and con-

Compressed air has moved into the gaging and measuring picture to provide speed with accuracy. Most checks take only seconds.

trols the department's records, develops and issues all written operating procedures, initiates and approves all changes in procedure. It spearheads departmental planning.

The crucial job of setting up inspection standards usually rests with the inspection analysis and research group. This same group also handles statistical detail and determines how statistical methods are to be applied to routine inspection operations. One of its most important functions is the running of an inspection laboratory. This laboratory, in cooperation with the engineering department, analyzes the cause of defects, proposes corrective action, and recommends salvage or rework procedures.

In the larger establishment, the three principal segments of the inspection function may be further subdivided in the interests of operating efficiency. The important point to remember is that this natural division of functions is generally applicable to the majority of inspection organizations, regardless of size.

A lot has been written about the "human aspects" of a quality control system. What most of it boils down to is a recognition of the fact that somewhere along the line the inspection function is bound to involve policing. And viewed pessimistically, the policeman's life has more than an average amount of headaches. It is also pretty risky.

Allis-Chalmers

X-ray inspection has become more and more commonplace in the metalworking industry. Even massive sections for army tanks are so tested.

The essence of the psychological review of the inspector's problem is that he—if he is to be successful—must be a rather unusual fellow. This is basically true, although the emphasis on "unusual" is probably misplaced.

If the successful inspector is unusual at all, it is most likely because he is more temperate, more objective, more steadfastly guided by facts and principles than are many of his coworkers. These traits stem from an intelligent understanding of his responsibilities—to top management, to inspection policy, and to the ultimate consumer.

A wise management backs its inspectors' authority to the hilt. It never deviates from established principle, no matter how attractive a temporary deviation may seem. It recognizes that the quality of its products and the maintenance of that quality are the surest measure of a company's life expectancy.

Most—but not all—of the inspector's functions are pretty well defined by departmental procedures, company rules, and general operating policy. Maneuvering within this fixed body of laws is relatively easy even when it isn't especially pleasant or comfortable. With the law on his side, the inspector's position is virtually unassailable.

Where Judgment Pays

But, as might be expected, there is always the exceptional circumstance where the rules either do not fit or cannot be properly applied. To correctly handle a situation of this sort calls for judgment as well as tact. It also requires a modicum of courage and devotion to duty.

An incident relating to the manufacture of pinions illustrates this exercise of judgment as it applies to the inspection function. In this particular case, the pinions were among the more critical parts of a highly critical engine. Customers' experience indicated that these pinions were more susceptible to failure in operation than any other component in the entire engine.

Ultimately, the engineering aspects of the problem were solved by an improvement in design. Pending solution, however, it was necessary to continue the manufacture of standard pinions. The only alternative was to discontinue all production.

Management, needless to say, was not fond of this alternative. It ordered the production of pinions continued, emphasizing that they be

treated with special care. The inspection department was alerted.

Work proceeded in an atmosphere of tenseness. After a couple of days, the first major slip occurred. In a rough machining operation, about 75 pinions were cut eccentrically on a shaper before the defective setup was detected.

A quick check of dimensions revealed that, although the eccentric pinions were out of dimension for the shaping operation, they were still within clean-up tolerances. In other words, there was a chance—however slim—that they could be satisfactorily reworked and, after additional processing, wind up as acceptable parts.

The line foreman for manufacturing immediately insisted upon rework. He had no intention of accepting scrap charges for 75 parts that might be salvaged.

The inspection foreman favored scrapping the parts. His line of reasoning was based on a realization of the critical functioning of the parts and a fairly good memory. He recalled that, in the past, attempts to salvage pinions in this condition were invariably unsuccessful. Lack of success had nothing to do with machining. It stemmed mostly from subsequent distortion in heat treating.

As the battle raged on and moved upward in organizational echelon, engineering was called in for its expert opinion. Although favoring inspection's decision to scrap the parts, engineering was not in a position to insist that this action be taken.

Its ultimate authority applied to finished parts only. Its decision had to be: let's judge the parts at final inspection, making sure that they are kept separate from regular production parts throughout the remainder of processing.

With engineering more or less perched on the fence, inspection management finally decided to authorize rework. Twenty-seven operations later, all but 2 of the 75 pinions were rejected and scrapped. Scrap costs per pinion were increased from about $8 to about $40. The original judgment of the line inspection foreman proved to be almost 100 pct correct in this case.

Consolidated Engr. Corp.

Another type of mass spectrometer, this unit employs the gas inlet system. Checking chemical analysis is standard practice.

But it is precisely such decisions, based primarily on judgment and experience, that make the inspector's job important. It is frequently the "tough" decision that presents the real challenge and underlines the creative aspect of the inspection function.

Because judgment and tact frequently play a prominent role in the average inspector's daily routine, it is advisable that the hiring and promoting of inspection personnel be carefully systematized. Slipshod methods are not likely to consistently place personnel in positions for which they are best fitted.

How To Split The Inspection Pie Profitably:

1) Examination and testing: handles all routine inspection, including receiving inspection, in-process inspection, and final inspection of assemblies or finished parts.

2) Administration and planning: maintains all of the organizational aspects of the inspection department, including personnel procurement and training, keeping departmental records, developing operating procedures, approving procedure changes.

3) Analysis and research: sets up inspection standards, handles statistical methods, operates an inspection laboratory, suggests corrective action, salvage and rework.

Management vs Inspection

A wise management backs its inspectors' authority to the hilt. It never deviates from established principle, no matter how attractive a temporary deviation may seem. It recognizes that the quality of its products and the maintenance of that quality are the surest measure of a company's life expectancy.

And the "fitting" of an inspector to his job, it is important to note, must weigh personality factors as well as aptitude.

Although many of the larger metalworking companies have been using aptitude and personality tests for more than a decade, smaller companies tend to steer clear of a formalized testing program in connection with the hiring and upgrading of personnel. This is understandable, since the administration of test programs usually requires a staff of professional experts in the field of personnel administration. In the smaller company, maintenance of such a staff on a full-time basis would be difficult to justify.

An important part of the inspector's duties involves the avoidance of rejects before they occur. Here, inspector checks milling machine.

Regardless of a company's size, however, a set of formal standards covering personnel requirements can prove to be a valuable guide in building a sound organization. In the parlance of the experts, such standards are called "job descriptions" and "job evaluations."

Rather than resort to formalized definitions, a review of two typical job standards dealing specifically with the inspection function is likely to prove more helpful. The examples chosen were prepared by Consolidated Vultee Aircraft Corp. prior to 1943 and have been used successfully ever since.

Let's first consider a job description intended for personnel in "rough" inspection. The formal title for the job, according to C-V practice, is "Inspector—Receiving." Its prime function, as stated in a summary, is "examination of purchased items."

The actual work performed is stated clearly in a single paragraph. "Inspecting purchased items to determine conformity to purchase order, drawing prints, specifications, and/or catalogue. Determining physical acceptability through application of visual, precision-instrument, and/or magnetic-particle testing. Verifying conformance to stipulated analysis, process, and strength requirements before accepting an item. Approving acceptable items, and maintaining required records—including receiving report. Issuance of rejection notices when required."

Tips on Job Evaluation

To further clarify the job requirements for both applicant and interviewer, the tools and equipment normally used by a receiving inspector are carefully spelled out. "Precision measuring instruments, gages, and test equipment; check fixtures and templates; inspection stamps. All conventional forms of inspection equipment, including surface-finish analyzers."

Knowledge and ability required for the specific job are also described. "Know receiving inspection methods and procedures, including use of drawing prints, specifications, catalogues, and standards handbooks. Ability to recognize any defect that may exist; and to be acquainted with peculiarities of items purchased from different vendors. Use arithmetic, including decimal and common fractions."

Here, then, is a sound starting point for choosing the right man for the job. The particular merits of the job description are that it states precisely what the job entails and tends to standardize requirements for each individual job. Still, it needs the additional back-up of a job evaluation.

The job evaluation provides a means for numerically rating the individual requirements for a specific job in terms of their relative

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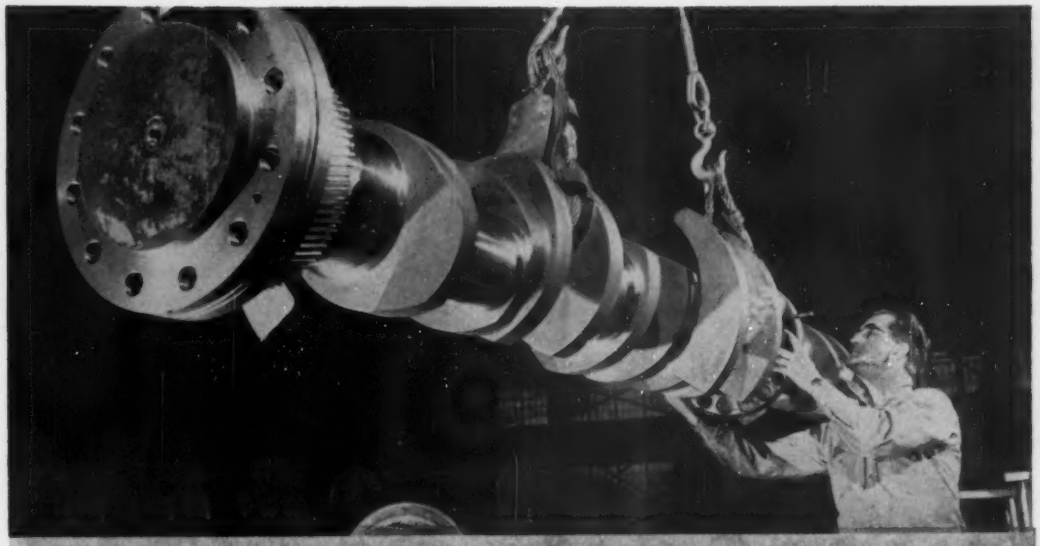

Inspector holds micro-calipers on a connecting rod bearing of a new crankshaft made for a new design diesel engine, guaranteeing right fit.

importance. In the case of the receiving inspector, for example, the total rating for the job is 420 points. Highest rating given any one factor is 200 points—for a minimum of 2 years' experience.

Four other factors are similarly rated in terms of their importance: mentality (80 points), responsibility (40 points), mental application (40 points), physical application (20 points).

Two other factors are also rated, although they apply to the nature of the job rather than the ability of the applicant. These are job conditions (15 points) and unavoidable hazards (5 points).

The last two factors serve a useful purpose to both interviewer and applicant by indicating whether or not the job entails any "disagreeable elements" or involves working under hazardous conditions. Such conditions should always be explained to the prospective employee prior to his employment.

For a job requiring considerably higher skills and the frequent exercise of careful judgment, the job description for a salvage inspector offers significant contrast. A salvage inspector, according to the C-V standard, is responsible for the "inspection, investigation, and disposition of rejected items while serving as a member of the salvage committee."

The role of judgment is repeatedly implied in the description of the work a salvage inspector is expected to perform. Note especially those words italicized in the following description of functions:

"*Determining*, as chief inspector's representative on the salvage committee, the *practicability* of salvaging rejected items. *Final authority* on scrapping items *unsuited* for salvage acceptance. *Making recommendations* for disposition of rejected items . . . *Conducting salvage investigations* . . ."

The job evaluation prepared for a salvage inspector noticeably reflects a switch in emphasis from the strictly routine to the more responsible. Experience required, for example, is a minimum of 5 years and is rated at a much higher level (325 points). The "responsibility" factor jumps to 100 points. For a receiving inspector, this same factor rated only 40 points.

Inspection Is A Science

As these sample evaluations indicate, it is important to stress the proper factors—and to a correct degree—in fulfilling the personnel requirements of an inspection department. A less formal system of evaluations, even though it may seem to function acceptably, is less likely to provide the degree of consistency that can be obtained with numerical ratings.

The science of the inspection function is largely dependent upon measurements. As the instruments of measurement become more and more precise, the science of inspection at first overtakes, and ultimately surpasses, the art. The role of judgment is not erased by any means, but it ceases to be omnipotent. Opinion, however expert, is supplanted by fact.

Such is the continuing trend. In modern times, it has intensified to the point where the value of an inspection department is sometimes judged by the quality and quantity of its physical equipment. If this view is extreme, it is so only because it overemphasizes the obvious. Good inspection equipment, admittedly, is indispensable.

In the field of mensuration, much of our present-day equipment consists of up-to-date refinements of instruments developed over a period of many centuries. Such instruments as linear scales, calipers, and micrometers might be included in this class. To a lesser degree, the same classification might well apply to gages—plug, ring, snap, feeler, or what have you.

All of these instruments are at least as useful as they are commonplace. It is safe to assume that their types and sizes, virtues and limitations, are well known to the metalworking industry as a whole. For this reason, further discussion of these instruments is likely to prove superfluous.

Instruments Aid Quality

Less well-known are some of the modern, and generally more complicated, instruments for detecting flaws and measuring specific properties. Many of these instruments have become a part of the everyday equipment of the average inspection department. They are not at all uncommon. But they are still relatively new and, most important, provide a potential for further development.

Magnetic particle inspection may be chosen as a typical example of the modern approach to non-destructive examination. It is dependable, fast, and can be readily adapted to mass production techniques. Applied to ferromagnetic materials, it uncovers otherwise invisible surface and subsurface flaws by a combination of magnetism and a suspension containing finely divided magnetic particles which are attracted to the location of the defect.

In everyday practice, the part undergoing inspection is first magnetized in an electromagnetic field. This field may be induced by direct current, alternating current, or rectified alternating current.

Once magnetized, the part is then dipped, sprayed, or coated with an oily suspension containing very fine magnetic particles. These particles are immediately drawn to the area of the defect—even when the defect is 1 in. or more below the surface.

The magnetic particle process is known by its trade name, Magnaflux. Magnaglo is a modification employing the same general principles. It does, however, make use of fluorescent particles and examination is conducted under black light. For non-magnetic materials, Zyglo fluorescent penetrant inspection is helpful in revealing surface defects. The Statiflex process serves a similar purpose for a variety of non-metallic materials such as glass, plastics, and ceramics.

Use New Techniques

Other outstanding flaw detectors, of course, are to be found in the field of ultrasonic test equipment (THE IRON AGE, July 26). Applications involving ultrasonic energy are literally expanding by leaps and bounds, so that even the latest news seems a trifle old. Nevertheless, a recent tally indicates that there are now at least 12 separate and distinct inspection processes requiring the use of ultrasonics. The best known have to do with flaw detection and thickness and grain-size measurement.

Until fairly recently, radiographic inspection was limited exclusively to the use of various types of x-ray equipment. The advantages of this equipment are well known and have been widely publicized. X-ray's principal disadvantage is that it is too expensive a process to apply to the routine inspection of inexpensive articles.

Gamma-ray radiography is of more recent vintage and promises to provide greater versatility in the fields of non-destructive testing and inspection. Because the sources of gamma rays are radium, radon, and various radioactive isotopes, initial material costs are high. Availability of these materials is necessarily limited for reasons of defense as well as public safety. But in the future, gamma radiography is bound to play a leading role.

ACKNOWLEDGMENT

Of the various sources consulted, the editors recommend the following texts for their more specialized treatment of the principles and instrumentation of inspection and quality control: **Quality Control:** N. L. Enrick, New York, 1954; **Inspection Organization and Methods:** J. E. Thompson, New York, 1950; **The Non-destructive Testing of Metals:** R. F. Hanstock, London, 1951; **Mechanical Inspection:** W. H. Armstrong, New York, 1953.

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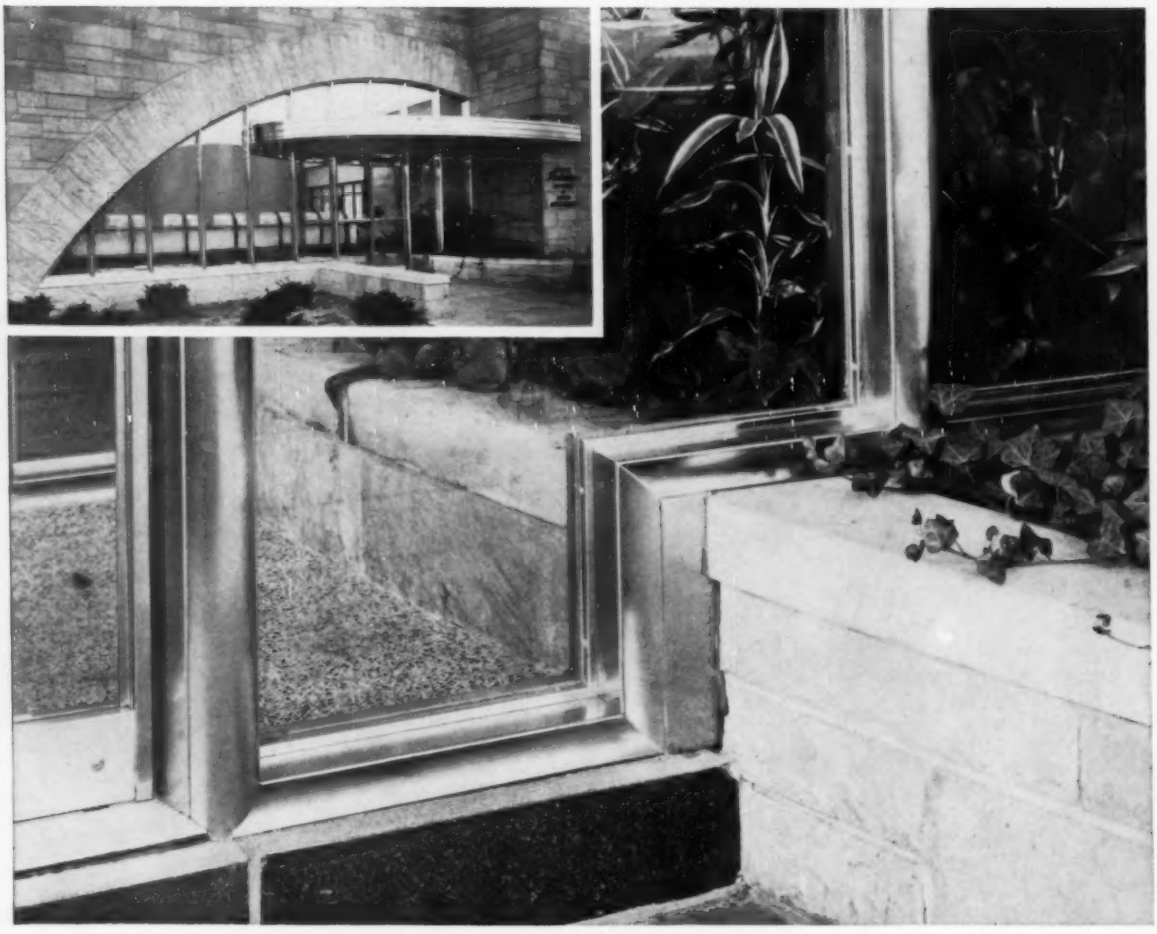

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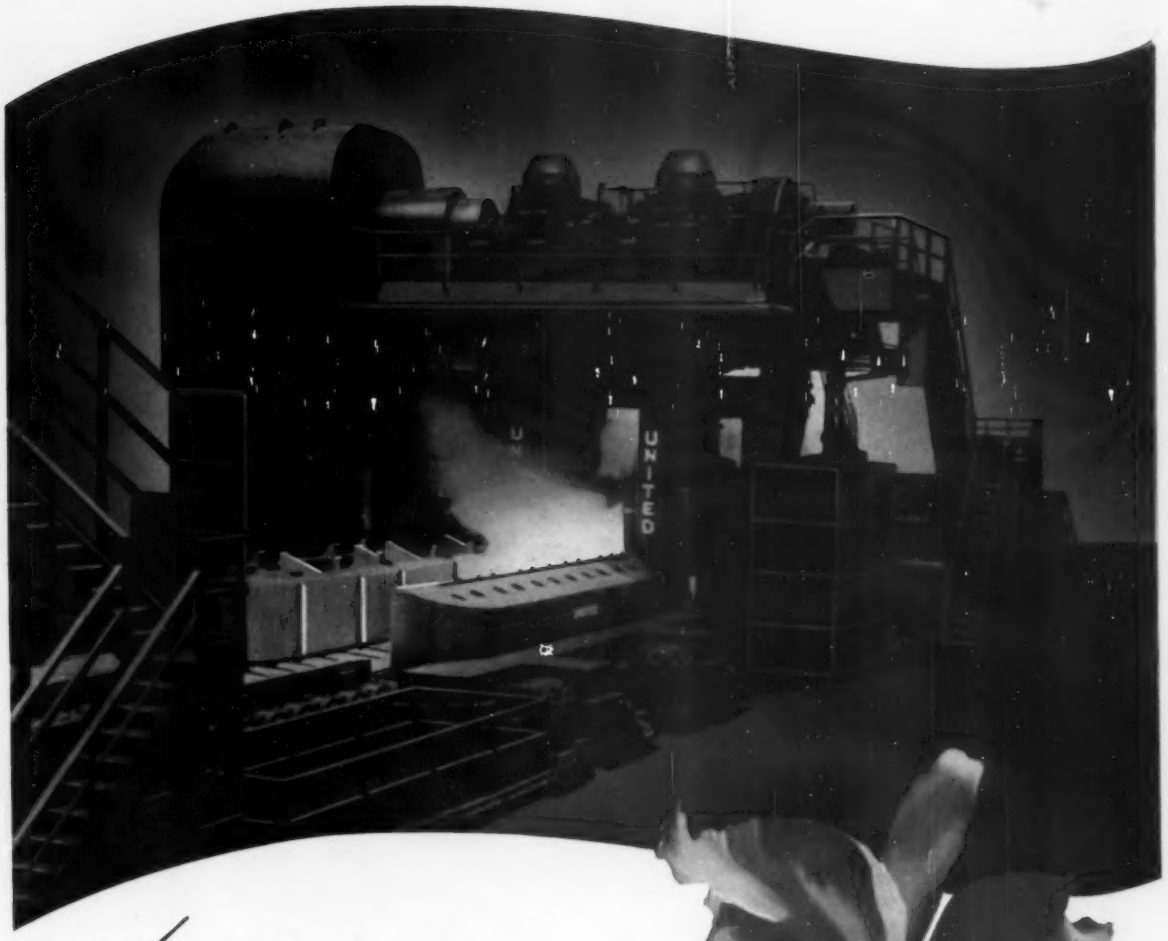

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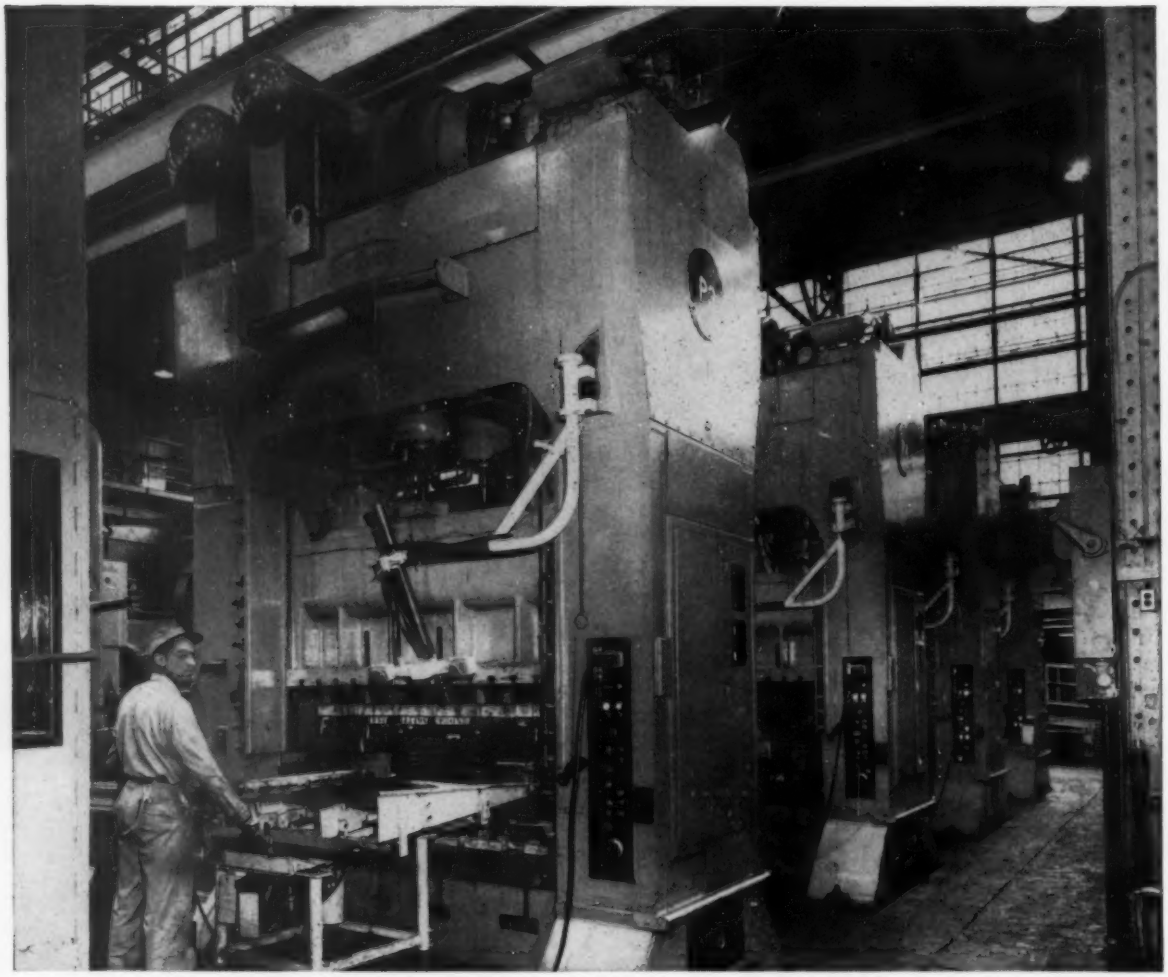

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YOUR GUIDE TO COLUMBIA HIGH SPEED TOOL STEEL GRADES

TYPE AND GRADES	DESCRIPTION	HARDENING RANGE	QUENCH	TEMPERING RANGE	USEFUL HARDNESS
T1 — CLARITE	Standard type, high red hardness, good strength, wide range of use with high over-all efficiency	2000° F. to 2350° F.	Oil or Salt Bath	1000° F. to 1250° F.	65/60 Rc
T2 — VANITE	Increased carbon and vanadium; best for form tools and finishing cuts	2300° F. to 2375° F.	Oil or Salt Bath	1000° F. to 1050° F.	66/63 Rc
T4 — ACMITE	18-4-1 high speed steel with 5.00% cobalt added; for heavy cuts, all around high speed cutting with long life at high speeds.	2325° F. to 2375° F.	Oil or Salt Bath	1000° F. to 1025° F.	66/64 Rc
T5 — COBITE	18-4-2 with 8.00% cobalt high speed steel, extreme red hardness, for hogging cuts on scaly and hard abrasive materials	2325° F. to 2375° F.	Oil or Salt Bath	1000° F. to 1100° F.	66/64 Rc
T8 — MAXITE	High carbon, high vanadium with 5.00% cobalt. High production steel for cutting hard castings and tough heat treated alloy steels	2325° F. to 2375° F.	Oil or Salt Bath	1025° F. to 1075° F.	66/63 Rc
M2 — MOLITE SMOOTHCUT	Molybdenum-tungsten multipurpose high speed steel with smoothcutting additives for greatest economy	2100° F. to 2275° F.	Oil or Salt Bath	1000° F. to 1250° F.	66/58 Rc
M3 — MOLITE 3	Molybdenum-tungsten high speed steel with higher carbon and vanadium for fine cuts including broaching and reaming	2175° F. to 2250° F.	Oil or Salt Bath	1000° F. to 1100° F.	66/63 Rc

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILLINOIS

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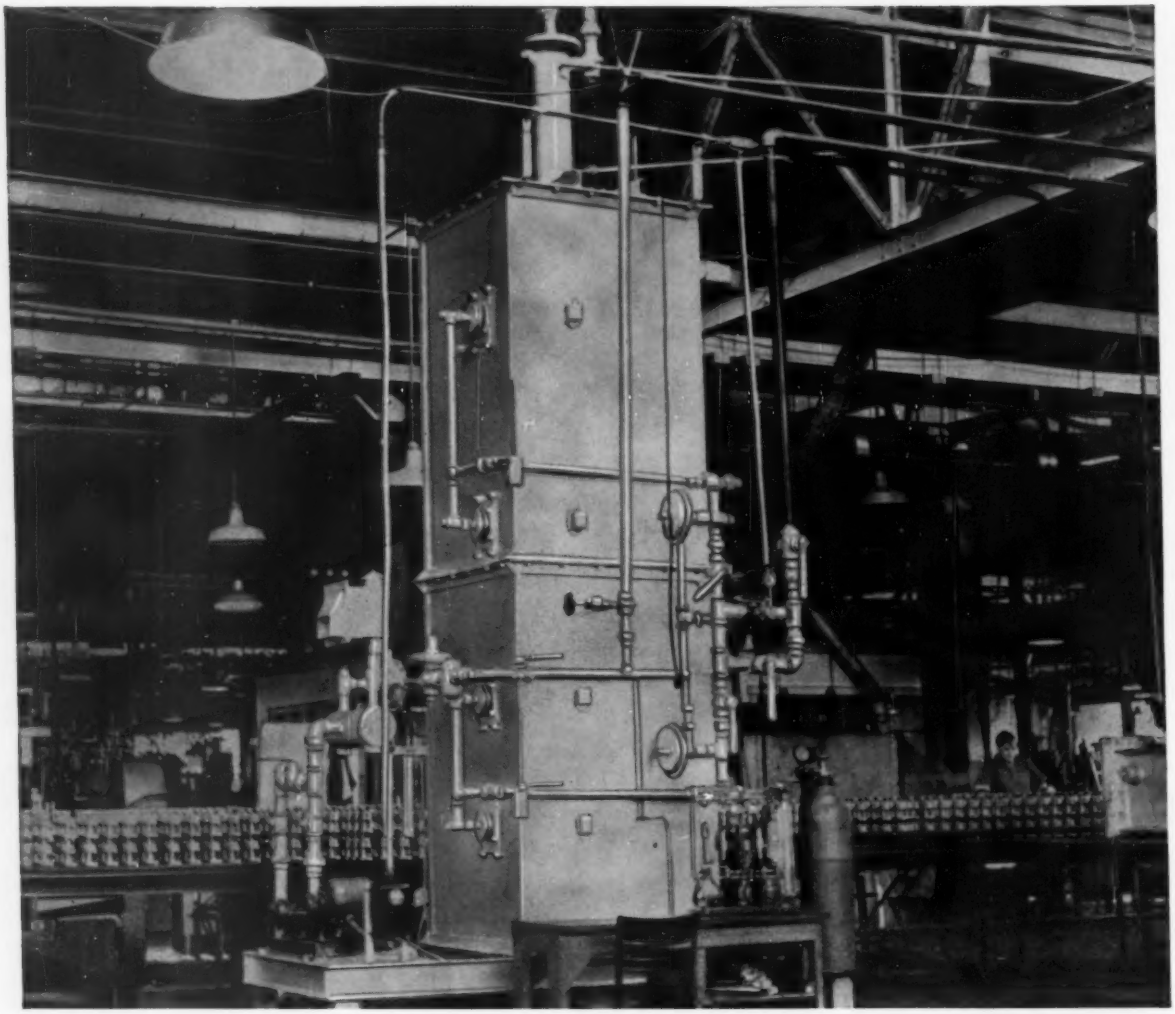
1957

TOOL COLUMBIA STEELS

COLUMBIA TOOL STEELS

DIE STEELS: Superdie — Atmodie — E-Z-Die Smoothcut — Exl-Die — CEC Smoothcut HOT WORK STEELS: Clarite HW — Formite #3 — Formite #2 — Molite HW10 — Vanadium Firedie — Alcodie — Firedie CARBON TOOL STEELS: Columbia Special — Vanadium Extra — Waterdie Extra — Columbia Extra — Columbia Extra Headerdie — Vanadium Standard — Columbia Standard



1,500,000 cfh of atmosphere

That's the combined capacity of all the Surface RX® gas generators sold since this first one started operating April 4, 1941. This was the first practical catalytic gas generator for continuous bright gas carburizing . . . and it's still in use at Warner Gear Division, Borg-Warner Corp.

Such long-term reliability is only one of the reasons why so many plants standardize on Surface gas generators. Controllability, flexibility, turn-down operation, variety of gases and capacities are some of the other reasons. We'll be happy to tell you more about them.

Make Booth 421 your first stop at the Metal Show—just a few steps inside the Arena, Cleveland Public Auditorium, Oct. 8-12.

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Surface®
HEAT TREATING EQUIPMENT

NATIONAL METAL SHOW

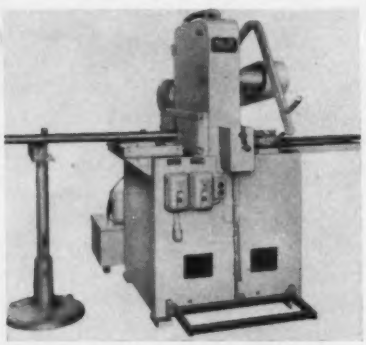
SHOW PREVIEWS

Eyecatchers At The Coming Metal Show

Watch for these displays as you walk the aisles of the upcoming Metal Exposition . . . Such new equipment can mean much in your 1957 production setup . . . And might make the difference between a profit or loss in the coming year.

Abrasive cutting

An oscillating wet abrasive unit is a rugged machine that speeds cutting of medium-sized bar stock, etc. through an oscillating cutting motion. Equipped with a large diameter abrasive wheel, up to 18 in. for certain applications, it will sever sheets, angles, channels, pipes, tubes and solids of practically all analyses. This includes hard-



ened or annealed steel, brass, bronze, monel, aluminum, magnesium, tungsten, tantalum carbide, beryllium, titanium, ceramics, phenolic plastics, glass, etc. Designed for use in metal working shops, factories, mills, foundries, and maintenance shops, this unit is capable of cutting 3 in. diam solids, 4 in. diam tubing and 6 in x 1 in. steel plate at 90° to axis at speeds of approximately four seconds per sq in. of material being cut. Its swivel type vise can be rotated from 0 to 45° with a maximum opening for 45° cuts of 4 in. Furnished with a 10 hp motor, it measures 68 x 62 x 65½ in. Net weight, with electrical equipment, is approximately 2000 lb. *American Chain & Cable Co. Booth 1816.*

For more data circle No. 1 on postcard, p. 257

Sheet, plate cutter

With a stationary lower and reciprocating upper tool, a new sheet metal and plate working machine has many new and improved features. It has eight different speeds and stroke lengths between 0.059 to 0.244 in. for versatility in cutting and working sheet metal and plate. Adjustment of the cutting tools has been made simple and accurate. Precision cutting leaves edges requiring no further finishing. Upper tool can be lowered in steps. This enables it to do an improved job of cutting louvers of different sizes and shapes in sheet metal. Frame is of welded steel plate, heat treated and designed for strength. Machine has edge cutting capacity of 9/32 in. in mild steel. Attachments are available for straight cutting, circle cutting, louver cutting and dishing. *American Pullmax Co. Booth 2521.*

For more data circle No. 2 on postcard, p. 257

Multiple drive system

A new synchronized, variable speed drive system for multiple drives has been announced. Heart of the system is a power unit which interlocks the motors by means of electrical impulses. Simply turning the control dial on the power unit varies the speed of every motor in the system equally and simultane-

ously. The ac motors are the squirrel-cage induction type, and connect to the power unit by standard 3-phase circuitry. When the motors operate in tandem, as on a conveyor, they share the load equally. This single factor largely eliminates costly damage from extreme overloads at any one point on the conveyor, typical of systems without load distribution. *U. S. Electrical Motors, Inc. Booth 2330.*

For more data circle No. 3 on postcard, p. 257

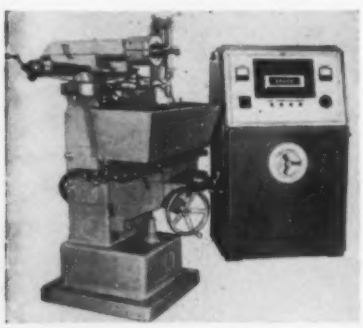
Polyester film

Clear polyester film is now heat sealable on both sides, enabling it to be combined into tubular forms. It is durable, non-toxic and chemically resistant. The film can be used for packaging items ranging from acid to precision metal parts, lubricating and food oils to solvents. The polyester material has a tensile strength of 8700 psi, and elongation at break of 270 pct. *Minnesota Mining & Mfg. Co. Booth 2822.*

For more data circle No. 4 on postcard, p. 257

Electronic eroder

Operating on a 20 pct higher cycle than previous models, an entirely new electronic erosion machine reproduces directly the shape and profile of a soft master electrode in carbide with an accuracy of ±0.0015 in. and 10 micro in. finish. A 5 hp high-frequency motor generator set at the machine's bottom is fed ordinary three phase 220v current. It converts this to high frequency single-phase current. This ac is rectified and changed into pulsating dc through three aircooled mercury rectifiers on top of the unit. Rectified pulsating current is fed through resistors,

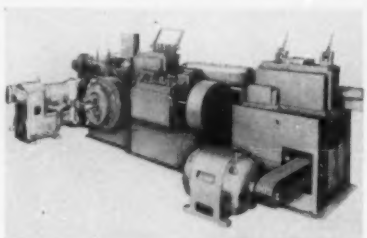


and balancing coil circuit to one or several batteries of capacitors which fill up the machine's center. These store the electrical energy, which is then released through a ½ in. diam conductor to the working electrode. Each battery of capacitors corresponds to a preset finish, which is changed by turning a switch. Its electro servo head comprises a motor that holds the electrode constantly at an exact distance (0.0015 to 0.15 in.) determined by a preset reference. The electrode advances as a tool gets machined. When the job is complete, the head actuates a relay retracting the tool. Thus, a job can be set on the machine and left unattended. *Abaco Industries, Inc., Booth 2434.*

For more data circle No. 5 on postcard, p. 257

Flying Cut-off

Improved flying shear cut-off equipment will be demonstrated at the forthcoming Metal Show. Use of an air clutch permits higher cut-off speeds, avoids shock. No adjustment is necessary since the clutch automatically compensates for wear. An air brake eliminates conventional mechanical drag brake and is only engaged for a

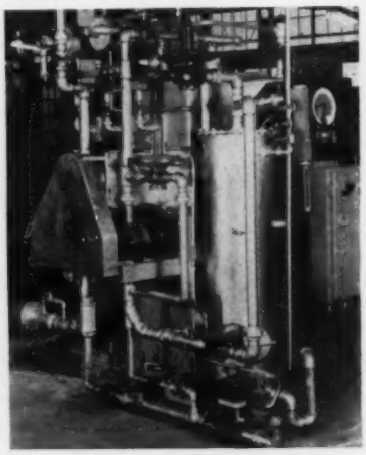


short portion of the cut-off cycle. Variable speed drive permits infinite adjustment of flywheel speed to synchronize cut-off and wire feed speeds. This arrangement is said to make possible cutting of rod without spot swell. It also allows finer adjustment for cutting short lengths. *The Lewis Machine Co., Booth 2002.*

For more data circle No. 6 on postcard, p. 257

Gas generator

Dewpoints ranging from +70°F to −70°F are possible with a gas generator to be demonstrated at the Metals Show. After burning a controlled mixture of gas and air, and cooling the combustion products, a controlled amount of raw gas is added to a part of the combustion products. The resultant mixture is then passed over a catalyst heated by the primary combustion. Gas produced by the secondary endothermic reaction can have an analysis ranging from perfect combustion to approximately 17 pct CO, 20 pct H_2, 63 pct N_2. This range covers a multitude of atmospheric treatments ranging



from clean annealing and sintering through clean hardening, carbonitriding and carburizing to treatments requiring extremely low dewpoints. *Holcroft & Co., Booth 346.*

For more data circle No. 7 on postcard, p. 257

Spectrometer

Development of a new vacuum direct-reading spectrometer for the rapid analysis of five principal elements in steel has been announced. It permits rapid spectrochemical analysis of carbon, phosphorus, sulfur, silicon and manganese from the sparking of a single sample. The time required for a duplicate analysis is two minutes. Analyses of all five elements are recorded in ink on paper to form a permanent record. The precision instrument may be used with the company's standard recording consoles now in use. A vacuum attained with a mechanical pump is sufficient for the spectrometer. Tank nitrogen is used around the sample in the excitation stand. The spectrum region normally used is 1500°A to 3500°A. However the instrument can be readjusted to cover the region from 1100°A to 3500°A to permit research in the analysis of the gases, hydrogen, nitrogen and oxygen, in metals. *Applied Research Laboratories. Booth 2122.*

For more data circle No. 8 on postcard, p. 257

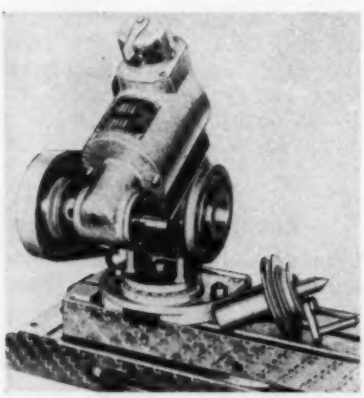
Dust collectors

Cyclone-type dust collectors feature connections to standard 55 gal drums. Their exhausting capacities range from 1000 to 1100 cu ft of air per minute at speeds in excess of a mile a minute. The collectors feed directly into standard 55 gal (or smaller) drums. These can be quickly removed and replaced when full. Originally developed as a special unit for the automobile tire industry, the series can be used wherever machinery creates great quantities of dust, buffing lint, chips or shavings that might tend to clog standard filters. Cyclone-type collectors use centrifugal force to precipitate all but the finest dust particles, up to 95 pct; with the other 5 pct being exhausted outside or trapped in an efficient after-filter bag. *Torit Mfg. Co. Booth 935.*

For more data circle No. 9 on postcard, p. 257

Grinding workhead

A new motor-driven workhead will be demonstrated at the Metal Congress. It's claimed accurate with 0.0002 in. FIR or less at spindle nose, and 0.0005 in. FIR or less on test arbor 6 in. from spindle nose. Compact and self-contained, the power unit is intended for internal and external grinding. It is held



in position by two T-slot bolts and mounts at any convenient spot on the table. The swivel base swivels the workhead a full 360° if desired. The hardened and ground tapered spindle receives chucks, collet fixtures, face plates, straight or tapered sleeves, centers and like equipment. *K. O. Lee Co., Booth 2044.*

For more data circle No. 10 on postcard, p. 257

Pyrometer

Designed particularly for precision temperature measurements in the laboratory, an optical pyrometer is sufficiently portable to be used for general plant applications. It meets the demand not only for higher degrees of accuracy but offers greater versatility in measurement of temperatures over 700°C (1300°F). The pyrometer is a multi-purpose instrument capable of measuring targets less than 0.001 in. in diam. By means of supplementary lenses, it can be adjusted for focal distances varying from 5 in. to infinity. Mountings on table-top and floor type tripods are available and the vernier worm gears permit extremely fine vertical and horizontal adjustments of the telescope. The optical system includes a micro-

scope type ocular providing a 20 power magnification of the object under measurement. A wide scale direct-reading meter makes it possible to reproduce temperatures with extreme accuracy. *Pyrometer Instrument Co., Inc.*

For more data circle No. 11 on postcard, p. 257

Drill press

Available in a wide range of models, a new 15-in. machine is designed to provide all the ruggedness and "guts" of much heavier drill presses. It is also highly versatile. The machine offers a total of six different spindle adapters. Primarily a production-line tool for wood and metalworking, the new machine is flexible enough and priced low enough to make it suitable for small commercial shops. Also, components of the press may be obtained for making up special purpose equipment. Extra ruggedness is provided by four over-sized, pre-loaded, lubricated-for-life ball bearings incorporated in the spindle construction. A heavy-weight head, cast in a single piece, and a large, two-in. diam quill provide rigidity and longer life. A multiple-spline "floating drive" means

less vibration, smoother operation and more power at the spindle. The machine's six separate spindle adapters feature taper mounting for accuracy and are firmly locked on the spindle with a threaded collar. With these adapters the machine can perform dozens of specialized tasks in addition to drilling holes (½-in. diam in cast iron, ⅜-in. in steel in production operations.) *Delta Power Tool Div., Rockwell Mfg. Co. Booth 1916.*

For more data circle No. 12 on postcard, p. 257

Degreaser

Incorporating all phases of degreasing, a machine shows a manufacturer the results obtained with any single type of degreasing or combination of methods including vapor, vapor spray, liquid immersion and vapor rinse, double liquid immersion followed by vapor rinse, liquid immersion, spray and final rinse. Improvements in cleaning through ultrasonics can be shown in addition to any of the above standard procedures. The unit incorporates ultrasonic transducers of 144 sq in. *G. S. Blakeslee & Co. Booth 1019.*

For more data circle No. 13 on postcard, p. 257

Oxide coatings

Protection against the effects of high temperatures, abrasion, erosion and corrosion is effected with a new line of oxide coatings. These can be applied to a variety of base

materials. Electrical insulation properties are also accredited to the coatings. They are reported as having already found many new uses, including applications in the field of rockets and jet propulsion. *Norton Co. Booth 2414.*

For more data circle No. 14 on postcard, p. 257

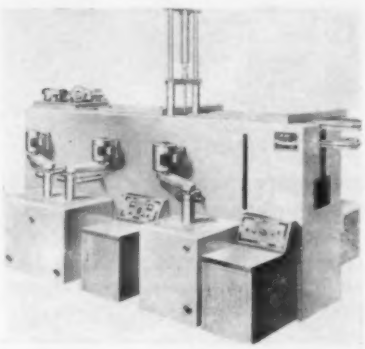
Bolt fasteners

An improved method for bolting parts in blind areas, where standard bolts cannot be inserted, has been announced. Using a new fastener, inserted from the nut side of the job, high-shear, high-strength fastening is achieved quickly and easily with no special tools. The fastener is designed for blind applications wherever they may occur. Installation is simple: (1) drill a 0.377-in. diam hole; (2) thread any standard $\frac{3}{8}$-24 nut loosely on the unit; (3) insert into hole and drive pin flush with top of bolt. (a blind head is formed automatically behind the hidden side of the work and the nut is then wrenched up tight). A screwdriver may be inserted in the slot to prevent turning, if necessary. Made of cadmium plated steel, 2 in. long, it consists of bolt and pin. Nuts are not supplied, due to the wide variety of styles for various applications. *Southco Div., South Chester Corp. Booth 1017.*

For more data circle No. 15 on postcard, p. 257

Ultrasonic cleaner

A completely automatic, 5-stage, monorail ultrasonic cleaning system can be seen at the upcoming Metal Show. To be demonstrated with actual production line parts, machine will show how ultrasonics can clean blind holes and difficult recesses of castings, engine parts, stampings, valve bodies and other parts. The equipment combines a single ultrasonic cleaning stage with more conventional wash, rinse and dry sections. Parts are carried through the machine on an automatic indexing conveyor. In the ultrasonic cleaning section, the parts lower automatically into the ultrasonic tank where high-frequency sound waves break con-



tamination loose from the metal parts. Solution tanks and drying air heat electrically and are temperature-controlled. *Ransohoff, Inc., Booth 2734.*

For more data circle No. 16 on postcard, p. 257

Furnaces and controls

High speed steel hardening at low cost is promised with a redesigned model furnace and "Diamond Block" control method. The electric high-speed-steel hardening furnace, utilizing this method, produces quality hardening on all types of tungsten, cobalt and molybdenum high-speed steels and high-carbon high-chrome die steels. It prevents scale formation or decarburization. The automatically-maintained atmosphere requires no manual adjustments. Constant

hardening results are obtainable from day to day by either trained metallurgists or inexperienced operators. *The Sentry Co. Booth 1203.*

For more data circle No. 17 on postcard, p. 257

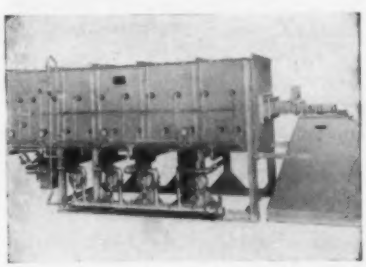
Rust preventive

Efficient stoppage of rust is reported of a recently developed rust preventive. The indoor type, multi purpose material can be mixed with water, oil or solvent. It can also be used neat if desired. This rust preventive base, when mixed with water, produces a non-volatile solution which is helpful in improving plant safety conditions. *E. F. Houghton & Co. Booth 1145.*

For more data circle No. 18 on postcard, p. 257

Reciprocating furnace

Completely automatic, a heat treating installation features the latest



improved series reciprocating furnace produced by one manufacturer. This furnace installation in-

corporates many new improvements such as a stationary muffle with moving hearth, positive atmosphere control, and a simplified hearth operating mechanism. The fully automatic production furnace has a heat treating capacity of 450 lb per hr. It discharges work into automatic quenching, washing and tempering equipment. Clean hardening, light case carburizing, etc., can be accomplished without any changes or modifications. Continuous flow, rather than batch processing, assures that each work piece receives its own individual heat treatment, quench, wash and temper. *American Gas Furnace Co. Booth 2841.*

For more data circle No. 19 on postcard, p. 257

Testing machine

Low capacity testing machines are available as special tension, compression, flexure or universal testers. The machines perform their testing functions in capacities from 1000 lb down. The compact design of the units (each machine occupies 5 sq ft of floor space) makes them ideal for "on-the-spot" quality control tests on production lines. Load is indicated on a 15 in. diam dial mounted on top of the machine. Either of two capacity ranges, full and 1/5 or ¼ capacity, are instantly available at the flip of a convenient range selector switch. Both ranges have the same zero and are provided with individual zero adjusters. The single range of infinitely variable speed, normally from 0.3 to 12 ipm, but also available in other 40 to 1 ratios, is said to be positive under load as well as no load. *Tinius Olsen Testing Co. Booth 1137.*

For more data circle No. 20 on postcard, p. 257

Centerless grinders

Centerless grinding machines featuring a new and exclusive traverse reversing device have been announced. For heavy stock removal requiring several passes, the traverse reversing device permits grinding of the workpiece in both directions of traverse. This feature is said to eliminate handling costs and to reduce production time to a minimum. Two centerless machines connected in tandem will be demonstrated at the Metals Show showing a precision grinding operation and a two-pass finishing operation on cylindrical bar stock. These machines operating as a unit will produce accurate work and a low micro inch surface finish in a single handling. *Production Machine Co., Booth 1809.*

For more data circle No. 21 on postcard, p. 257

Walking beam furnace

A new walking beam furnace recently introduced features non-alloy construction for low initial cost and minimum maintenance costs. The basic design suits it for high temperature forging operations as well as heat treating and annealing. Simple water-cooled I-beams with special refractory piers avoid the need for alloy walking beams, and largely eliminate beam warpage, fatigue, operating jams and hard-to-get alloy parts. A single drive reciprocates the four refractory beams. A mechanical linkage between the charge and discharge ends provides a smooth and continuous motion. Air cylinders reduce horsepower required and supply a snubbing action on beam members to assure smoothness in movement. *Sunbeam Corp., Industrial Furnace Div., Booth 942.*

For more data circle No. 22 on postcard, p. 257

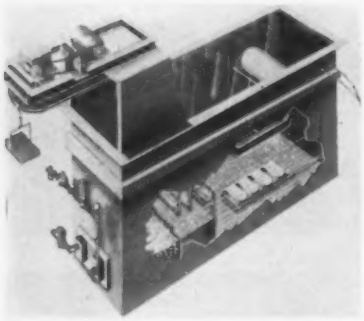
Paper wipers

Disposable paper wipers are now available in two different sizes from one maker. The original large size wiper consists of two-ply sheets that measure 9⅝ x 13⅝ in. For industrial wiping jobs that can be done with a smaller size wiper, however, the makers are now marketing a new brand. It consists of two-ply sheets measuring 9⅝ x 10⅝ in. Both products are identical except for size. They are being packaged in newly designed cartons, each containing 125 wipers, with 18 cartons to the case. The compact carton size takes up a minimum of space and it provides employees with an instant and mobile source of wipers. Like tissues, they "pop up" when one is removed. Among its reported advantages are: reduced unit cost, less expensive handling, no laundry loss, shrinkage and pilferage cut, better health protection for employees and reduced flesh cuts. *Scott Paper Co. Booth 703.*

For more data circle No. 23 on postcard, p. 257

Ultrasonic cleaning

Ultrasonic degreasing is performed with a self contained, monorail conveyorized ultrasonic cleaning machine. Following a solvent vapor-spray-vapor cleaning cycle, the work in process is immersed in an ultrasonically agitated trichlorethylene bath. Cleanliness of this bath is maintained by continuous distillation and filtration. After passing through the zone of ultrasonic agitation, the work receives a final rinse of pure solvent distillate and is dried in the solvent vapor. A multiplane monorail conveyor built

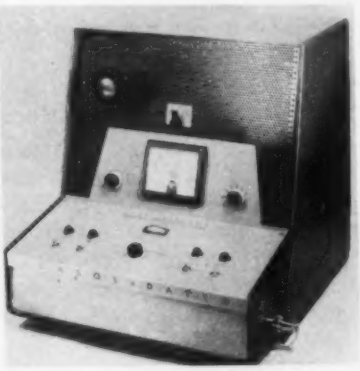


into the equipment provides a productive and compact machine for high quality cleaning. The steam-heated machine also incorporates recently developed design features. *Detrex Chemical Industries, Inc. Booth 1907.*

For more data circle No. 24 on postcard, p. 257

Leak detector

Precise location of leaks in pressure, vacuum, and hermetically sealed equipment is provided by a new type leak detector. Responding to the presence of helium used as a tracer gas, the instrument is capable of exacting tests of either evacuated or pressurized systems. It may be employed to show the existence or absence of any leak, to determine the rate of leakage, or to find the exact location of a leak. It is modern in design, can be easily transported, yet is extremely rugged and once set up will operate unattended. Although greatly simplified, the detector retains high performance characteristics. It will detect one part of helium in 300,000 parts of air. From initial start-up to the beginning of testing after a complete shut-down requires only twenty minutes of pumping time. The instrument's vacuum system



can be left in operation overnight, thus cutting warm-up time to a few minutes. *Consolidated Electrodynamics. Booth 1929.*

For more data circle No. 25 on postcard, p. 257

Salt bath furnace

A salt bath furnace to be demonstrated at the Metals Show permits replacement of submerged type electrodes without costly furnace shutdowns. Removable electrodes can be changed before the molten salt solidifies. Electrodes enter the pot from the top instead of through the back wall of the casing. There are no openings below the surface of the salt. An easily removable tile seals off all air. This prevents oxidation attack on the electrodes that

would normally take place at the air-salt interface, and assures much longer electrode life. Other features of design include a claimed pot life of up to 10 years; less electrode replacement time; less labor required to replace electrodes; spare casings no longer required. Resoaking of new tile pots is not necessary as the original pot is used. *Ajax Electric Co. Booth 1609.*

For more data circle No. 26 on postcard, p. 257

Hot spray painter

Hot spray painting equipment to be displayed at the Metals Show includes a pump model requiring no manual attention or packing adjustment. In addition, a new external temperature control is now available for precision viscosity adjustment of all materials. Regulated temperature applied to finishing material maintains constant

viscosity. Viscosity is reduced by the heat below a level practical with solvents alone. On spraying, solvents evaporate between gun and surface. This leaves a fast-drying, high solids film. Improved coverage, and quality control, higher production, time and material savings, all-weather spraying and longer film life are claimed. *The Spee-Flo Co., Booth 2772.*

For more data circle No. 27 on postcard, p. 257

Power screwdrivers

Power screwdrivers to be demonstrated at the Metal Show deliver uniform torque by virtue of a reportedly new clutch principle. The clutch disengages instantly and completely on reaching pre-set torque, thus eliminating operator judgment or reaction lag in precision driving of screws and nuts.

External torque adjusts for faster set-up time. Elimination of ratcheting means quieter operation, as does incorporation of mufflers to reduce exhaust noise. Screwdrivers

and nut setters operate in an adjustable torque range from 10 to 100 in.-lb. *Thor Power Tool Co. Booth 2723.*

For more data circle No. 28 on postcard, p. 257

X-ray instrument

X-ray fluorescence permits continuous determination of the thickness of a metal coating to the millionth of an inch with a new instrument. The single-purpose gage is designed to fulfill the need for gaging or continuous analytical control in industries where a single element determination is of importance. Since the unit is rugged yet simple, this set of packaged assemblies is adaptable directly to the production line. The three primary components of this equipment are an X-ray head, a high voltage source and a ratio recorder. *Applied Research Laboratories. Booth 1221.*

For more data circle No. 29 on postcard, p. 257

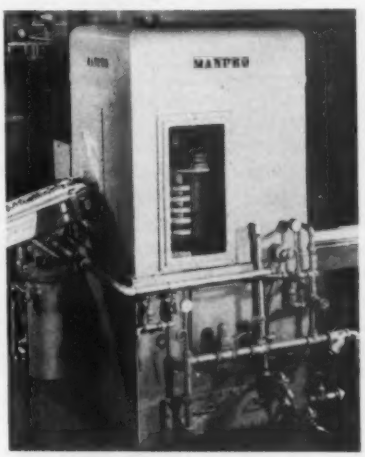
Rolling mill

Large in size, a laboratory rolling mill has a maximum separating force of 300,000 lb at 100 fpm. It can be used as either a two-high mill, or as a four-high mill featuring driven back-up rolls or work rolls. The mill can be equipped with a 50-hp adjustable speed drip proof constant-torque motor with eddy current braking. It is capable of taking heavy reductions on ferrous strip at all speeds between 100 fpm and 500 fpm. Many combinations of drives can be incorporated to meet customer specifications. The mill can be powered to take reductions up to 0.080 in. per pass. *Fenn Mfg. Co. Booth 331.*

For more data circle No. 30 on postcard, p. 257

Degreaser

Small parts are cleaned with a new degreaser. Work to be cleaned is loaded at a controlled rate into a conventional hopper. It is discharged into a pan at the bottom of a spiral elevator which carries the work through the cleaning cycle to a discharge chute. Oil, grease, dirt, wax, etc. is removed by vapors condensing on the relatively cool parts. As the work leaves the vapor zone, it dries immediately, thus providing a clean, warm, dry surface. Additional cleaning and rinsing may be accomplished by directing pure, clean solvent down the spiral



trough, washing over the work as it rises up the spiral, or by immersion in solvent at the bottom of the cycle. The degreaser assures a constant work flow, eliminating overloading and shock loading. Body is fabricated of 3/16 mild steel plate. Degreaser's dimensions are: 5 x 5 ft x 8 ft, 2½ in. *Manufacturers Processing Co. Booth 2821.*

For more data circle No. 31 on postcard, p. 257

Stud welding

End-welding of large diameter studs (one inch and over) is done with a new production unit. The unit utilizes an efficient stud welding gun along with a new 2000 amp welding generator developed for large diameter stud operations. A similar production unit made by the firm has end-welded more than 750,000 studs of various types during the past 10 yrs. On four major stud welding applications, costs were reduced over 50 pct. Stud welding eliminates leakage problems, always an important consideration with tank manufacturers, because no holes need be punched or tapped to receive threaded bolts. *Nelson Stud Welding Div., Gregory Industries Inc. Booth 1930.*

For more data circle No. 32 on postcard, p. 257

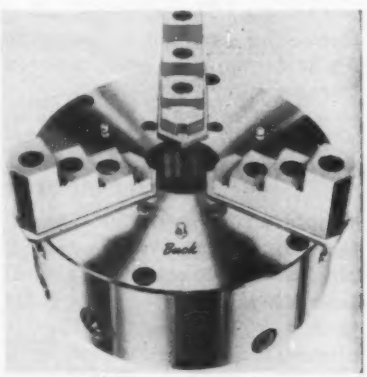
Welder's gloves

For light and medium welder's jobs, a new gauntlet welder's glove offers the same protection as leather welding gloves. It is flame and heat resistant, gives maximum comfort, increases manual dexterity and has unusual durability. It says soft; no amount of perspiration will make it hard or stiff. Hundreds of very closely-knitted loops per sq in. compose the fabric that absorbs heat slowly and cools quickly. *Advance Glove Mfg. Co. Booth 2803.*

For more data circle No. 33 on postcard, p. 257

Dustproof chuck

Making its initial bow is a dustproof chuck with several new features. It has been developed for use on grinding machines and dividing heads, and wherever abrasive dust and metal chips are a problem. Among advantages listed by the



manufacturer are: (1) it allows utilization of the chuck's full capacity range because the dustproofing mechanism does not interfere with the chuck's work-holding ability, and (2) it has a hole through its center. It can be used either dry or wet. *Buck Tool Co. Booth 1528.*

For more data circle No. 34 on postcard, p. 257

Ultrasonic cleaner

A new ultrasonic cleaning apparatus designed specifically for bench-top operation in the washing of delicate, intricate parts has been developed. The new instrument comprises a 36-40 kc/sec power generator, and a cylindrical cleaning tank, with transducers hermetically sealed into the base. RF generator power output averages 50 w

with 200 w available for peak pulsations. Maximum effective cleaning area is 18 sq in. Cleaning is effected by ultrasonic activation of the solvent, which is so gentle that it cannot harm even the most delicate components. The cleaning action reaches all surfaces accessible to the fluid, even blind holes. *Branson Ultrasonic Corp. Booth 2145.*

For more data circle No. 35 on postcard, p. 257

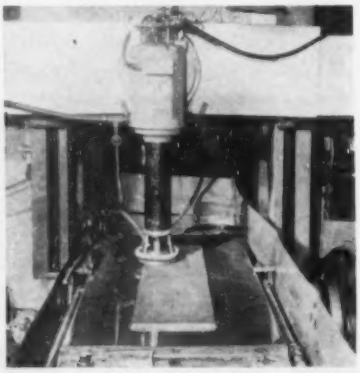
Vacuum furnace

Manufacturing precision components from high-purity alloys, which are highly reactive in normal atmosphere, by casting them under vacuum by investment casting or permanent mold techniques, is a relatively new development. Several firms have been evaluating this on an experimental scale. These components are usually of modest size; a large-capacity casting furnace is not generally required. A new precision-casting furnace incorporates many features of one company's broad range of larger vacuum furnaces. *F. J. Stokes Corp. Booth 1520.*

For more data circle No. 36 on postcard, p. 257

Precision spindle

A new precision spindle suitable for electrolytic grinding will be demonstrated at the Metals Show. Dynamically balanced, the spindle rides on permanently lubricated, preloaded,



selected ball bearings. Power source may range from ½ to 10 hp. The spindle alone is available, or it may be supplied with a tailored combination of slides and feeds to suit individual applications. *The Standard Electrical Tool Co. Booth 1047.*

For more data circle No. 37 on postcard, p. 257

Tough hacksaw blades

A new line of power and hand hacksaw blades just announced is said to provide faster, easier cutting and longer blade life on a wide range of cutting assignments.

Three blade types are offered. The special high speed steel power and hand blades are tempered for toughness and high speed cutting of hard materials with heavy speeds and feeds.

Welded edge power blades are double welded for shatterproof, safe, straight-cutting and long-lasting service. They are recommended for tough alloy steels, multiple cutting or interrupted cuts. Selected high speed steel power and hand blades are heat treated for high speed production sawing of hard-to-cut metals. *The L. S. Starett Co. Booth 919.*

For more data circle No. 38 on postcard, p. 257

Blast cleaner

Batch-type airless abrasive blast cleaning is done on this machine. Having a 28 cu ft load capacity, it is designed for cleaning sand, scale, oxides, and other contaminants from work that can withstand a tumbling action. Designed to improve blast cleaning efficiency and reduce cleaning costs, it operates

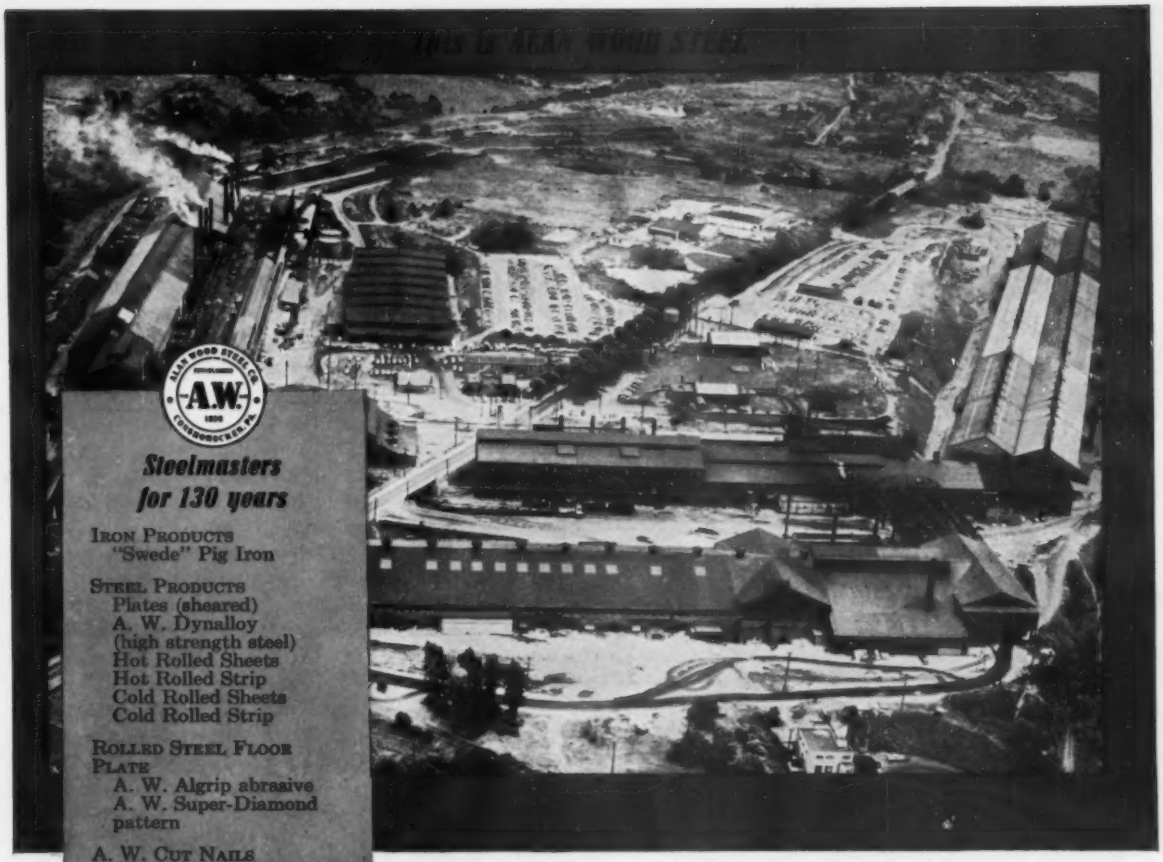
by centrifugally hurling metallic abrasive particles upon the work as it is tumbled over and over by a belt-type conveyor in the blast chamber. The abrasive hurling is done by a rotating bladed wheel in the chamber roof. *Wheelabrator Corp. Booth 2580.*

For more data circle No. 39 on postcard, p. 257

Gear hobber

A high speed universal gear hobbing machine with a differential attachment for simplifying the cutting of helical and spiral gears has a tangential feed for cutting worm gears and worms. Machine features high accuracy, exceptional versatility and rapid production. Spindle speeds for hob revolutions range from 117-167-235-339-470. *George Sherr Co. Booth 710.*

For more data circle No. 40 on postcard, p. 257



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"Swede" Pig Iron

STEEL PRODUCTS
Plates (sheared)
A. W. Dynalloy (high strength steel)
Hot Rolled Sheets
Hot Rolled Strip
Cold Rolled Sheets
Cold Rolled Strip

ROLLED STEEL FLOOR PLATE
A. W. Algrip abrasive
A. W. Super-Diamond pattern

A. W. CUT NAILS
Standard & Hardened

MINE PRODUCTS
Iron Ore Concentrates
Iron Powder
Crushed Stone
Grit
Sand & Engine Sand

COKE
Foundry, Industrial & Metallurgical

COAL CHEMICALS
Ammonium Sulphate
Benzol
Toluol
Xylol
Naphthalene
Sodium Phenolate
Tar Bases (Pyridene)
Solvent Naphtha
Crude Still Residue

PENCO METAL PRODUCTS DIVISION
Steel Cabinets, Lockers & Shelving

SIZE . . .

Large enough to have made an important contribution to the nation's industry . . . small enough to provide individualized service to its customers—that's Alan Wood's modern, flexible and fully integrated operation.

In ten years, Alan Wood has expended nearly $50,000,000 for additions and improvements, including a new blooming mill, continuous hot strip mill, picklers, modernized plate mill, cold reduction mill and annealing furnaces, plus other improvements.

Alan Wood expects to continue its growth—carefully, steadily—to provide more individualized services to more customers.

For information on Alan Wood Steel and its products, write Marketing Division—Department AW-47.

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...the *only* Coupling with truly Spherical Teeth

This exclusive coupling is widely endorsed for use on Tandem cold mills, Hot mills, Roller levellers, Pinch rolls, Slitters, etc.—wherever counter-rotating rolls are found—where compensation for angular and parallel displacement is required to facilitate roll changing—and to compensate for variable roll centers due to work roll grinding and/or due to thickness of material requirements. Sphereflex Roll Shaft Couplings give ±7% angular capacity, with a very minimum of backlash.

Sphereflex is the *only* coupling with truly *spherical teeth:* Root diameter, pitch diameter and outside diameter are generated as segments of concentric circles, giving a ball and socket action, and assuring highest torque-carrying capacity . . . all mating teeth maintain an area contact under load at the center of the male cut teeth, thereby *preventing rolling point contact* at maximum misalignment.

All exclusive points of design and construction of this unusual coupling are illustrated and explained in Bulletin C-561 . . . Send for copy on your Business Letterhead.

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Virginia Gear & Machine Corp. • Lynchburg, Va.

National Metal Show

Cleveland makes ready for 38th National Metal Exposition and Congress . . . Up to 50,000 expected in biggest get-together of metallurgists, engineers and executives ever.

The nation's metalworkers are poised for the 38th National Metal Exposition and Congress, scheduled for Cleveland's Public Auditorium from October 8 to 12 inclusive. Advance reservations point to attendance of more than 40,000 metalworking executives, engineers and production heads, and the total may hit 50,000. This figure exceeds that of last year's show (the largest ever) by at least 20 pct.

From noon on Monday, October 8 through the show's closing at 6:00 p.m. the following Friday, upwards of 475 exhibitors will play host to individuals and corporate buying teams hailing from points near and far. Exhibit footage now runs in the neighborhood of 300,000 sq ft, bulging available space. Show hours on Monday, Tuesday and Wednesday are noon to 10:30 p.m. On Thursday and Friday, the exposition is open from 10:00 a.m. to 6:00 p.m.

The opportunity for exchange of technical information is near unparalleled in American technological history. Six societies plan comprehensive programs comprising more than 155 individual technical papers.

The following societies plan to work together in this mutual interchange: American Society for Metals; Atomic Energy Commission (under AMS auspices); Institute of Metals Div., AIME; and American Welding Society. Groups holding concurrent sessions are Metals Div., Special Libraries Association, and Industrial Heating Equipment Association. See the pages which follow for details on technical programs.

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AMERICAN SOCIETY FOR METALS

PRE-SHOW SEMINAR

CREEP AND RECOVERY

All sessions in Grand Ballroom, Hotel Statler

Saturday, Oct. 6—9:00 a.m.

Chairman: R. L. Cunningham, Bureau of Mines, Ottawa, Canada

Defects and Recovery—J. S. Koehler, University of Illinois.

The Thermodynamics and Kinetics of Recovery—M. B. Bever, Massachusetts Institute of Technology.

Polygonization—W. R. Hibbard, Jr., General Electric Research Laboratories, Schenectady

Saturday, Oct. 6—2:00 p.m.

Chairman: B. L. Averbach, Massachusetts Institute of Technology

PROGRAM

Recovery of Electrical Resistivity—T. H. Blewitt, Oak Ridge National Laboratories.

Recovery of Mechanical Properties—E. C. W. Perryman, Atomic Energy Establishment, Chalk River, Canada.

Recovery of Internal Friction and Elastic Constants—A. S. Nowick, Yale University.

Saturday, Oct. 6—8:00 p.m.

Chairman: Bruce Chalmers, Harvard University

The Concept of Creep—E. N. da C. Andrade, F. R. S., London, England.

Sunday, Oct. 7—9:00 a.m.

Chairman: P. A. Beck, University of Illinois

Theory of Creep—G. Schoeck, Westinghouse Research Laboratories, Pittsburgh.

The Role of the Boundary in Creep Phenomena—E. R. Parker and J. Washburn, University of California.

The Effect of Alloying Elements on Creep—J. C. Fisher, General Electric Research Laboratories, Schenectady.

Sunday, Oct. 7—2:00 p.m.

Chairman: Eric Jette, Los Alamos, New Mexico

The Spectrum of Activation Energies for Creep—E. Dorn, University of California.

Creep and Fracture—N. J. Grant, Massachusetts Institute of Technology.

Creep of Crystalline Non-Metals—J. B. Wachtman, Jr., National Bureau of Standards, Washington, D. C.

TECHNICAL SESSIONS

All Sessions at Statler Hotel

Monday, Oct. 8—9:30 a.m.

PLASTIC DEFORMATION

Presiding Officers: L. J. Ebert, Case

PARTS LAST LONGER... if they're centrifugally cast by the Shenango process. Tougher parts because of finer, pressure-dense grain, greater strength, better elongation and freedom from sand inclusions and blow holes. There's minimum waste, less machining. The large bronze liner and seat ring shown here are typical of various parts, large and small, ferrous and non-ferrous, regularly produced in Shenango's modern plant. Informative bulletins give all the facts. Write to: Centrifugally Cast Products Division, The Shenango Furnace Company, Dover, Ohio.
How SHENANGO CENTRIFUGAL CASTINGS pay off!
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COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
MONEL METAL • NI-RESIST • MEEHANITE METAL • ALLOY IRONS

Institute of Technology, H. Y. Hunsicker, Aluminum Co. of America

Slip Twinning and Fracture in Single Crystals of Iron—J. J. Cox, Research Engineer, Experimental Station, E. I. DuPont de Nemours and Co., Wilmington, Del.; G. T. Horne, Asst. Professor and R. F. Mehl, Head, Department of Metallurgical Engineering, Carnegie Institute of Technology, Pittsburgh.

Dynamic Biaxial Stress-Strain Characteristics of Aluminum and Mild Steel—George Gerard, Asst. Director and Ralph Papirno, Associate Engineering Scientist , Research Division, College of Engineering, New York University.

Some Exploratory Observations of the Tensile Properties of Metals at Very Low Temperatures—E. T. Wessel, Research Engineer, Westinghouse Research Laboratories, Pittsburgh.

Effect of Strain Rate and Temperature on the Plastic Deformation of High Purity Aluminum—T. A. Trozera, Graduate Student; O. D. Sherby, Research Engineer, and J. E. Dorn, Professor of Physical Metallurgy, University of California.

HANSEN

SERIES RL

QUICK-CONNECTIVE

RING-LOCK COUPLINGS

HANSEN SERIES RL EFFECTIVELY HANDLES MORE VOLUME THAN ANY OTHER COUPLING OF EQUAL DIMENSIONS

Hansen Series RL One-Way Shut-Off Couplings will handle any job in your shop using ¾" to ⅛" connections—from the air line to the air tool. All Hansen Series 2-RL Sockets and Plugs are interchangeable with each other. Likewise all Sockets and Plugs of the slightly larger, greater capacity Series 3-RL are similarly interchangeable with each other.

Consequently, by standardizing on either Hansen Series 2-RL or Series 3-RL Couplings, you eliminate any need for various size couplings in your hook-up—make it easy to keep stock of parts in balance—and hold inventories to a minimum.

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Locking ring provides positive lock and assures tight fit. Equipped with automatic sleeve lock.

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WRITE FOR CATALOG

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Monday, Oct. 8—9:30 a.m.

IRON

Presiding Officers: Paul G. Nelson, The Budd Co.; Charles C. Reynolds, Massachusetts Institute of Technology.

The Effect of Subboundaries and Carbide Distribution on the Notch Toughness of an Ingot Iron—J. C. Danko, Instructor of Metallurgy, and R. D. Stout, Professor of Metallurgy, Lehigh University.

Notch Ductility of Malleable Irons—G. A. Sandoz, N. C. Howells, H. F. Bishop, Head, and W. S. Pellini, Metals Processing Branch, Naval Research Laboratory, Washington, D. C.

New Nodular Iron Process—H. K. Ihrig, Vice President in Charge of Research, Allis-Chalmers Mfg. Co., Milwaukee.

The Deformation and Rupture of Gray Cast Iron—W. R. Clough, Research Engineer, Metals Research Laboratories, The Electro Metallurgical Co., Niagara Falls, N. Y., and M. E. Shank, Associate Professor, Mechanical Engineering Department, Massachusetts Institute of Technology.

Monday, Oct. 8—2:00 p.m.

TITANIUM

Presiding Officers: Wm. Southard, Kennecott Copper Co.; J. L. Wyatt, Horizons, Inc.

Relative High Temperature Properties of the Hexagonal-Close-Packed and Body Centered-Cubic Structures in Iodide-Titanium — John Lunsford, Research Assistant and N. J. Grant, Associate Professor, Department of Metallurgy, Massachusetts Institute of Technology.

The Engineer from Continental Screw Co. ...

Brings you over 20 years' experience in aluminum fastenings

Long experience helps Continental advise you on aluminum fastener needs

You'll find a short talk about aluminum fasteners with Continental's engineers well worth your while. They pioneered in the development of these long-wearing, non-rusting lightweight fasteners and now offer you the largest range of sizes and types in the industry.

In addition to this large inventory, Continental's engineers can advise you about the replacement of copper and brass fasteners with aluminum. In many cases, you pay less for aluminum.

Continental handles both aluminum nuts and screws, including wood screws, machine screws, and tapping screws. They will also match any color you wish for your aluminum fasteners. For the kind of service that comes from long experience in the field, call on the engineers from Continental.

Only Continental Engineers Are Required To Have This Training

Each engineer at Continental is required to undergo thorough experience producing ground thread taps and gages, with their exacting screw thread dimensions. This special training is passed on to you—at no extra cost.

CONTINENTAL SCREW COMPANY INC. 1904

—You can count on Continental.

Continental Screw Co.

Manufacturers of Holtite Fastenings

New Bedford, Massachusetts, U.S.A.

NEW OAKITE CLEANERS
GIVE YOU MORE FOR YOUR
PAINT-PREPARATION DOLLAR

Here are 4 ways to end pre-paint metal-cleaning troubles

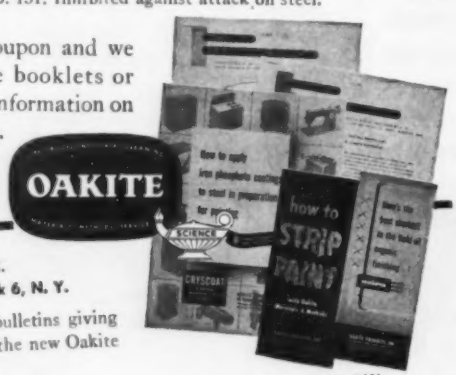
Does your trouble chart show that you need better cleaners, strippers or surface conditioners?

- ☐ Cleaning solution foams excessively in spray washing machine. See 1 below.
- ☐ Streaky discolorations or powdery residues cling to surface of steel parts being stripped for repainting. See 2.
- ☐ Zinc phosphating process too difficult to control . . . Iron phosphating process doesn't show good results in salt spray tests. See 3.
- ☐ Too many operations—cleaning, pickling, neutralizing, etc.—are needed to prepare steel that does not require phosphating before painting. See 4.

Here are brief descriptions of new Oakite materials designed to end these particular troubles:

1. For a spray washing solution that does not foam at high pressure, try Oakite Composition No. 161. Does not attack aluminum.
2. For stripping pigmented paint, phosphate coatings and undercoat rust *in one operation*, try Oakite Rustripper.
3. For a zinc phosphating process that is truly easy to control, try new Oakite CrysCoat SW . . . For salt spray results far beyond the capacity of ordinary phosphating processes, try new Oakite CrysCoat No. 89.
4. For *one-operation* removal of rust, heat scale, welding residues and light soil together with good preparation for painting, try Oakite Compound No. 131. Inhibited against attack on steel.

FREE Check the coupon and we will send you free booklets or bulletins with full information on new Oakite cleaners.



OAKITE PRODUCTS, INC.
30H Rector Street, New York 6, N. Y.

Send me free booklets or bulletins giving complete information on the new Oakite materials checked below:

- ☐ Oakite Composition No. 161
- ☐ Oakite Rustripper
- ☐ Oakite CrysCoat SW
- ☐ Oakite CrysCoat No. 89
- ☐ Oakite Compound No. 131

NAME _____

COMPANY _____

ADDRESS _____

PROGRAM

The Influence of Alloying on the Elastic Modulus of Titanium Alloys—W. H. Graft, D. W. Levinson and W. Rostoker, Supervisor, Physical Metallurgy Research, Armour Research Foundation, Chicago.

A Study of the Air Contamination of Three Titanium Alloys—J. E. Reynolds, Principal Metallurgist, H. R. Ogden, Assistant Chief, and R. I. Jaffee, Chief, Nonferrous Physical Metallurgy Div., Battelle Memorial Institute, Columbus, O.

Effect of Sulphur on the Properties of Titanium and Titanium Alloys—L. W. Berger, Principal Met., D. N. Williams, Asst. Chief, and R. I. Jaffee, Chief, Nonferrous Physical Met. Div., Battelle Memorial Institute, Columbus, O.

Relationship Between Heat Treatment, Structure and Mechanical Properties of a Titanium Alloy Containing 4 Pct Cr and 2 Pct Mo—A. W. Goldenstein and W. Rostoker, Supervisor, Physical Metallurgy, Metallurgy Res., Armour Research Foundation, Chicago.

Tuesday, Oct. 9—9:00 a.m.

STEEL I

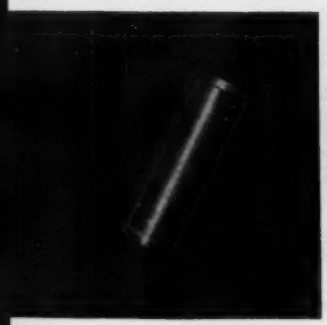
Presiding Officers: Fran Bolger, Battelle Memorial Institute; George H. Enzian, Jones & Laughlin Steel Co.

Temperability of Steels—L. D. Jaffe, Chief, Materials Section, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, Calif., and Edward Gordon, United Gas Corp., Shreveport, La. (formerly with Jet Propulsion Laboratory).

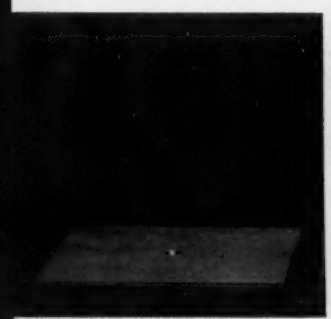
The Temperature Dependence of the Hardness of "Pure" Iron and Various Ferritic Steels—F. Garofalo and D. C. Marsden, U. S. Steel Corp., Edgar C. Bain Research Lab., Monroeville, Pa., and G. V. Smith, Bard Professor in Metallurgical Engineering, Cornell University.

The Influence of Bainite on Mechanical Properties—R. F. Hehemann, Asst. Prof., V. Luhanov, Res. Asst., and A. R. Troiano, Professor and Head, Department of Metallurgical Engineering, Case Institute of Technology, Cleveland

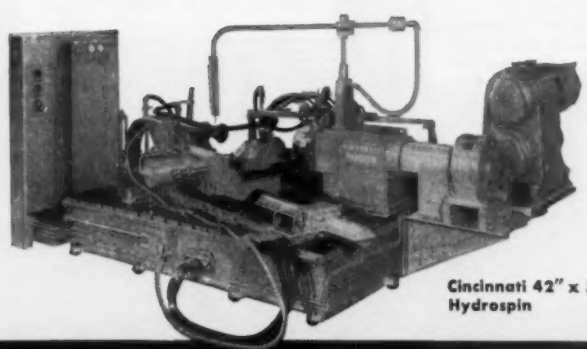
Why remove metal when you can move metal



into the shapes you want with the Cincinnati Hydrospin



A wide range of parts can be produced quickly and at low cost by "*chipless machining*" on the Cincinnati Hydrospin. Less metal is wasted and parts have accurate dimensions, high strength and good finish. Let a Process Machinery Division field engineer give you full details. For a description of the process and machine specifications, write for Bulletin M-1873-3.



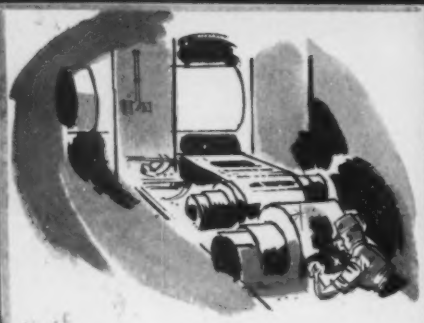
Cincinnati 42" x 50" Hydrospin

✳ Upper sequence of photos shows *one continuous* tube spinning operation. Starting blank, far left, of SAE 4130 is 8¾" long x 3" I.D. x 0.155" wall thickness. Finished part, shown at far right, Hydrospun in one pass, is 31" long x 3" I.D. with 0.030" wall thickness.

✳ Lower sequence of photos shows *one continuous* shear spinning operation. Starting blank, far left, is of type 302 stainless steel, 12" square x ¼" thick. Finished part, shown at far right, Hydrospun to a 32° included angle in one pass, is 14" high with 0.069" wall thickness.

CINCINNATI **Hydrospin**

PROCESS MACHINERY DIVISION
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U. S. A.

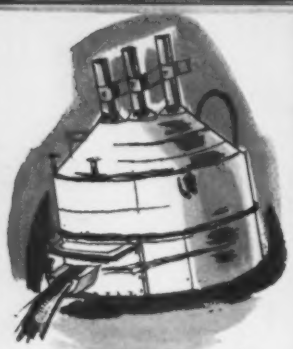


Stainless Steels

A pioneer and prime supplier of Stainless to the automotive, appliance and general fabrication industries, Sharon is one of the most experienced producers of this metal in the nation today. Sharon makes a complete line of chrome, chrome-nickel and special grades including the new 200 series.

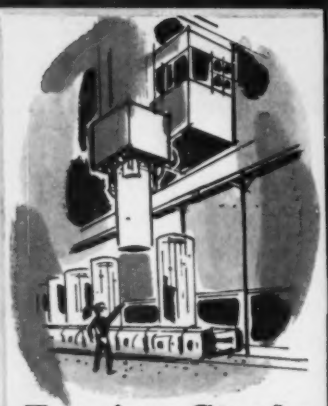
Lo-Alloy Hi-Strength Steels

In Lo-Alloy Hi-Strength Steels Sharon offers users a choice of two of the finest — Sharon Cor-Ten® and Sharon N-A-X® — plus other grades for particular requirements. Such products as earth moving machine frames, truck and bus frames, boiler tubes, bumpers, petroleum and gas pipe lines, transmission parts, brake shoes are currently being made from these steels. Available in heavy plate, hot and cold rolled strip in coils or cut lengths.



Alloy Steels

Sharon has long been a leading source for special alloy steels compounded to meet specific requirements. Many such alloys have been made to achieve added strength or to provide greater heat and corrosion resistance.



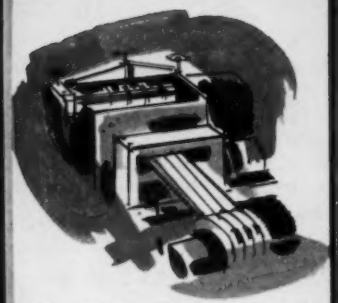
Forging Steels

Sharon Forging Ingots, Blooms and Billets are available in carbon, alloy, stainless and special analysis steels in a wide range of sizes.

Strapping Steels

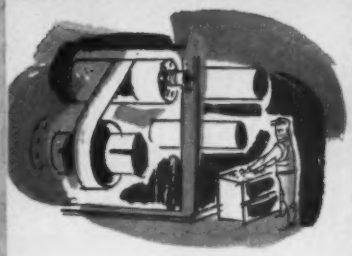
Strapping steel is available in black painted and galvanized finishes in a complete range of sizes from ⅜" x .010 to 2" x .065 with the tools, accessories, seals, nails, corner protectors, staples, anchor plates, etc. as required.

Here's the Sharon Family of quality metals!



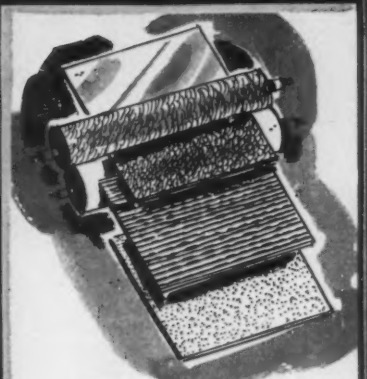
Spring Steels

Sharon has a complete line of high carbon, cold rolled alloy and plain steels with S.A.E. designation of 1025 or above with excellent application reputation. Typical uses are cutlery, fasteners, clamps, chains, clips, saws, etc.



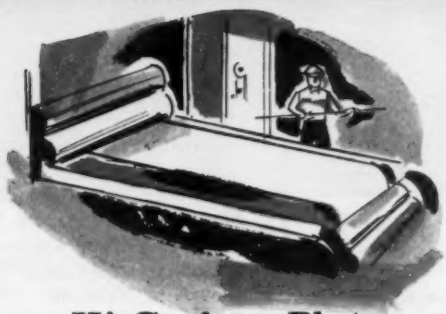
Coated Steels

Sharon Galvanite® is one of the finest hot dip zinc coated steels available to manufacturers today. Tightly bonded, it has a "matte" surface to which enamels adhere exceedingly well. Sharon also rolls top quality terne, a bright surface hot dip and electro galvanized steel.



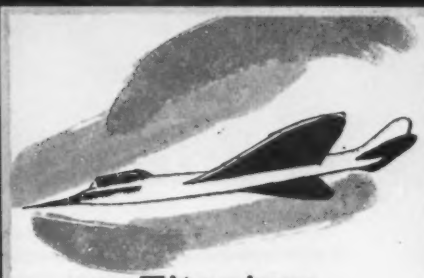
Sharonart

Rolled-in surface pattern steel, exclusive with Sharon, enables manufacturers to change product style without changing dies. Available in a wide variety of standard patterns, or specials where required. Typical products include hardware, automotive trim, machine cases, radio and TV cases and trim.



Hi-Carbon Plate

One of the few sources of supply for quality high carbon plates in the full S.A.E. range from 1010 to 1090 for such appliances as structural plates, railroad equipment, road working machinery, scraper blades, farm equipment, etc.



Titanium

Mallory-Sharon has for the past few years been providing industry with titanium in many grades in hot rolled sheet, hot and cold rolled strip, rods, bars, billets, wire coil and plates.

Here you see a gallery consisting of the more prominent members of the Sharon family of metals. Brought into existence more than half a century ago, this family has steadily grown and prospered to become recognized throughout the automotive, appliance and general metal fabricating industries for unsurpassed dependability and quality at its finest.

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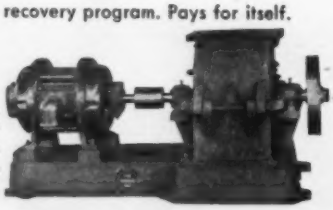

WRITE for Coal Crushing Bulletin

American PULVERIZER COMPANY
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PROGRAM

On the Cooling Transformations in Some 0.40 Pct Carbon Constructional Alloy Steels—D. J. Bickwede and R. C. Hess, Asst. Div. Head and Res. Engineer respectively, Research Department, Bethlehem Steel Co., Bethlehem.

Tuesday, Oct. 9—2:00 p.m.

STEEL II

Presiding Officers: R. D. Chapman, Chrysler Corp.; C. T. Evans, Universal-Cyclops Co.

Impact Characteristics and Mechanical Properties of Leaded and Non-Leaded C-1050 and C-1141 Steels—A. P. Weaver, Senior Metallurgist, Quality Control Department, Inland Steel Co., East Chicago, Ind.

Relation of Inclusions to the Fatigue Properties of SAE 4340 Steel—H. N. Cummings, F. B. Stulen and W. C. Schulte, Chief Metallurgist, Propeller Div., Curtiss-Wright Corp., Caldwell, N. J.

Effect of Silicon on Transverse Properties and on Retained Austenite Content of High Strength Steels—John Vajda, J. J. Hauser and Cyril Wells, Metals Research Laboratory, Carnegie Institute of Technology, Schenley Park, Pittsburgh.

Bend: Tensile Relationships for Tool Steels at High Strength Levels—J. C. Hamaker, Jr., Manager, V. G. Strang, Res. Met., and G. A. Roberts, Vice President, Technology, Vanadium-Alloys Steel Co., Latrobe, Pa.

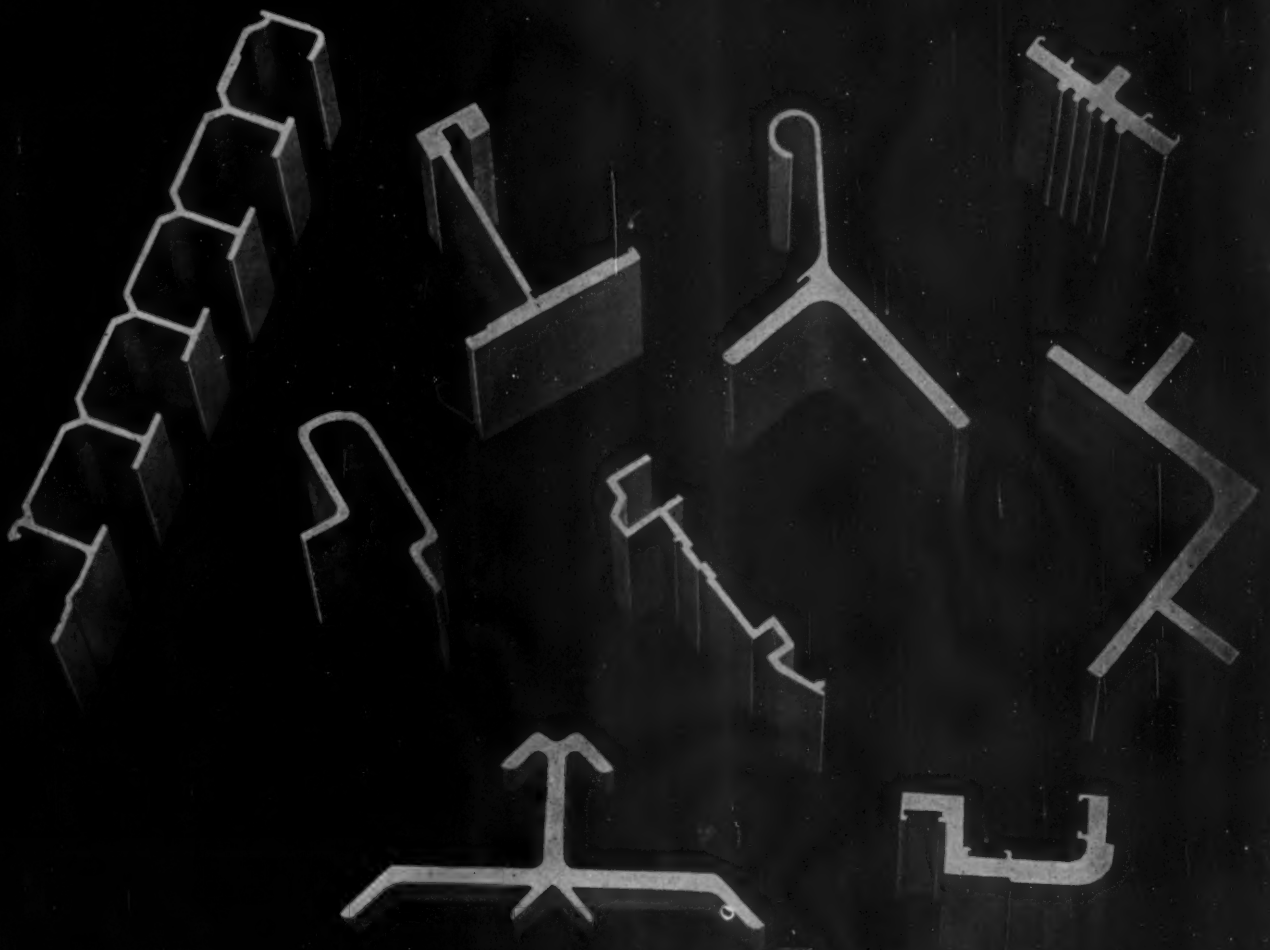
Wednesday, Oct. 10—2:00 p.m.

STAINLESS

Presiding Officers: A. E. Nehrenberg, Crucible Steel Co. of America; E. E. Reynolds, Allegheny-Ludlum Steel Co.

Precipitation Reactions in Austenitic Cr-Mn-C-N Stainless Steels—Chi-Mei Hsiao, Staff Metallurgist, and E. J. Dulis, Supervisor, Research & Development Lab., Crucible Steel Co. of America, Pittsburgh.

Martensitic Transformation in the Machining of Austenitic Stainless Steel—E. F. Erbin, Titanium Metals



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EXTRUSIONS

Corp. of America, New York.; E. R. Marshall, Associate Prof. of Civil Engineering, University of Vermont, Burlington, Vt.; and W. A. Backofen, Asst. Professor of Metallurgy, Metals Processing Lab., Massachusetts Institute of Technology.

Transformation Products in Cold-Worked Austenitic Manganese Steel—R. K. Buhr, Met., Div. Chief, S. L. Gerstman, Met. and Asst. Div. Chief, Physical Metallurgy Div, Mines Branch, Dept. of Mines and Tech. Surveys, Ottawa, Ontario; and James Reekie, Res. Director, Northern Electric Co., Ltd., Montreal, Quebec.

Metallography of Titanium-Stabilized 18-8 Stainless Steel—T. V. Simpkinson, Met. Dept., Republic Steel Corp., Warren, O.

Phase Relationships and Mechanical Properties of Some Iron-Chromium-Carbon-Nitrogen Alloys—G. F. Tisinai, Project Engineer and C. H. Samans, Assoc. Director, Engr. Research Dept., Standard Oil Co., Whiting, Ind.

Wednesday, Oct. 10—2:00 p.m.

NUCLEAR MATERIALS

Presiding Officers: W. D. Manly, Oak Ridge National Laboratories; Frank Rough, Battelle Memorial Institute.

Creep and Stress Rupture Properties of Zirconium Effect of Annealing Treatment—R. W. Guard and J. H. Keeler, Research Laboratory, General Electric Co., Schenectady.

Transformation Kinetics of Uranium-Niobium and Ternary Uranium-Molybdenum-Base Alloys—by R. J. Van Thyne and D. J. McPherson, Metals Research Laboratory, Armour Research Foundation, Chicago.

Transformation Kinetics of Uranium-Molybdenum Alloys—R. J. Van Thyne and D. J. McPherson, Metals Research Dept., Armour Research Foundation, Chicago.

The Plastic Deformation of Uranium on Thermal Cycling—H. H. Chiswik, Associate Director, Metallurgy Div., Argonne National Laboratory, Lemont, Ill.

Thursday, Oct. 11—9:30 a.m.

HIGH TEMPERATURE I

Presiding Officers: Glen A. Fritzlen, Haynes Stellite Co.; L. P. Jahnke, General Electric Co.

Effect of Sigma Phase on Co-Cr-Mo Base Alloys—Ronald Silverman, Sylvania Electric Co., Bayside, N. Y.; Wm. Arbiter, Nuclear Development Corp. of America, White Plains, N. Y.; and Frank Hodi, U. S. Army.

An Austenitic Alloy for High Temperature Use.—R. W. Guard and T. A. Prater, General Electric Research Laboratory, Schenectady.

High Temperature Rupture-Strength Properties of Chromium-Nickel Stainless Steels Containing Titanium and Boron—J. Salvaggi and L. A. Yerkovich, Metallurgy Section, Materials Dept., Cornell Aeronautical Lab., Inc., Buffalo.

Effect of Environment on Creep-Rupture Properties of Some Commercial Alloys—Paul Shahinian, Metallurgy Div., Naval Research Lab., Washington, D. C.

The Influence of Molybdenum on the Phase Relationships of a High Temperature Alloy—H. J. Beattie, Jr., and F. L. VerSnyder, Metallurgy Applied Research Materials & Processes Lab., General Electric Co., Schenectady.

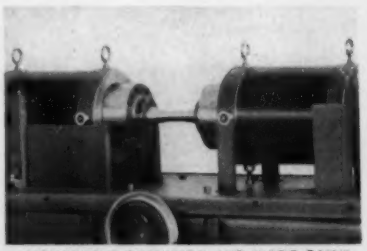
Thursday, Oct. 11—2:00 p.m.

HIGH TEMPERATURE II

Presiding Officers: J. Freeman, University of Michigan; E. J. Whittenberger, U. S. Steel Corp.

The Mechanical Properties of Iron-Aluminum Alloys—W. Justusson, V. F. Zackay and E. R. Morgan, Physical Metallurgy Section, Scientific Laboratory, Ford Motor Co., Dearborn.

Some High Temperature Oxidation Characteristics of Nickel with Chromium Additions—G. E. Zima, Research Engineer, International Nickel Co., Bayonne, N. J. Research Lab., (formerly with California Institute of Technology.)



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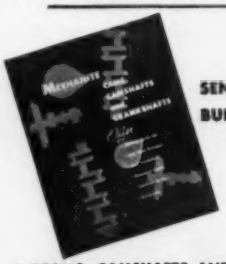

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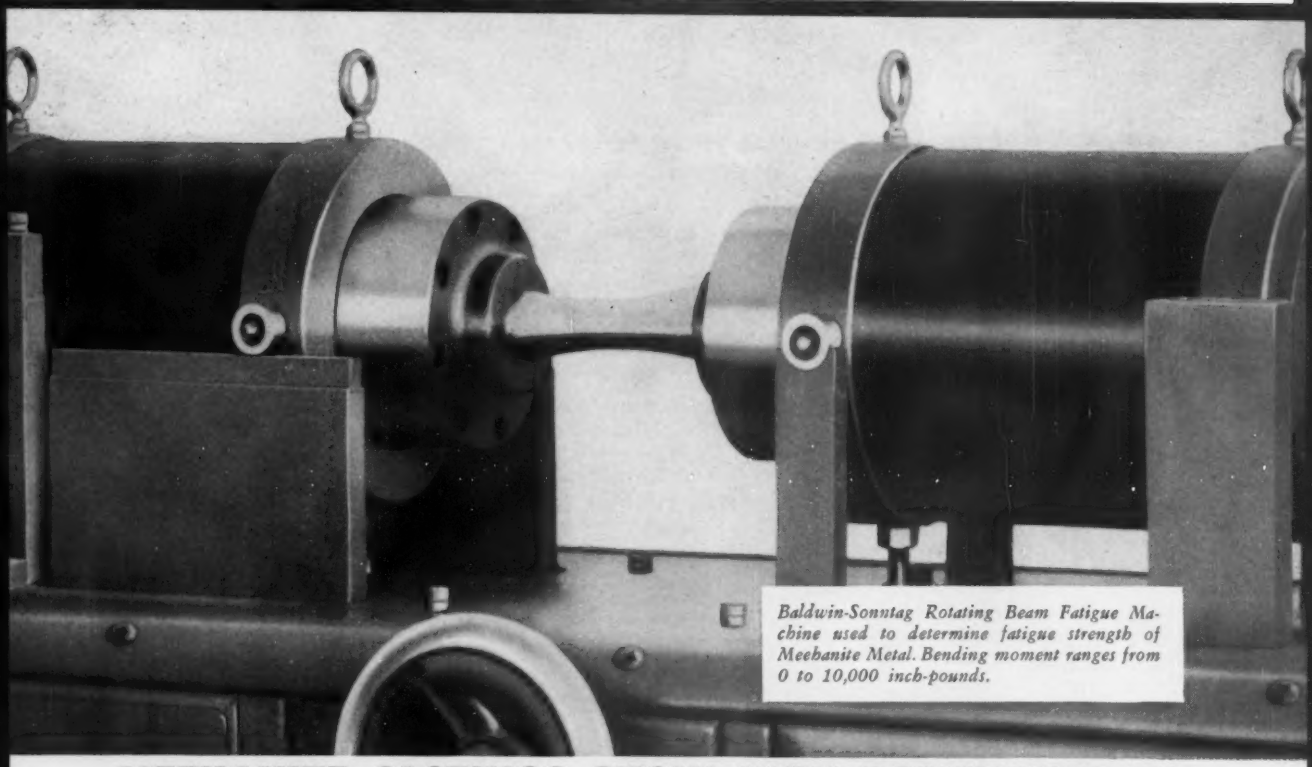
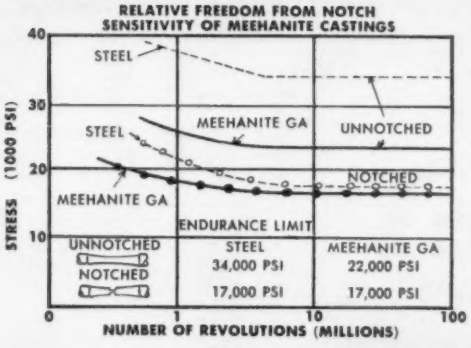


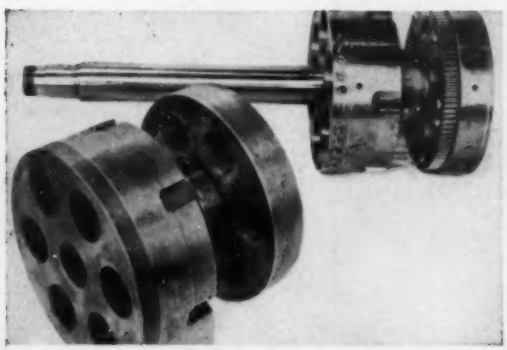
Baldwin-Sonntag Rotating Beam Fatigue Machine used to determine fatigue strength of Meehanite Metal. Bending moment ranges from 0 to 10,000 inch-pounds.

MEEHANITE CASTINGS SHOW HIGH RESISTANCE TO FATIGUE UNDER ROTARY BENDING STRESSES

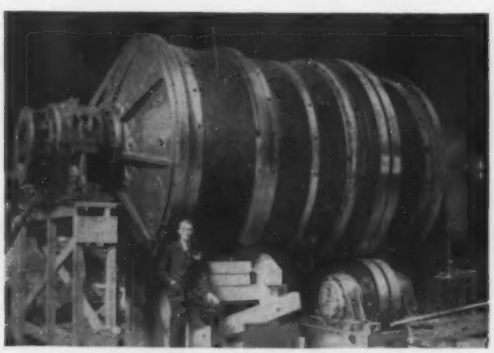


Meehanite Metal, subjected to alternating bending stresses, exhibits high endurance values and the fatigue strength is higher in relation to tensile strength than most other materials. The endurance limit approximates 45% of the tensile strength, thus providing a larger margin of safety against mechanical failure in the presence of stress raisers, such as notches, keyways, poor fillets and poor machine finish.

Consequently, Meehanite Metal has found wide application in the manufacture of crankshafts, centrifuges, ball mill crushers, machine tool spindles and other parts repeatedly stressed by bending loads. *Write today for Bulletin No. 39 "Cams, Camshafts and Crankshafts."*



Meehanite spindles for automatic bar and chucking machines withstand rapid and heavy torque shocks and maintain accuracy of tool alignment during service.



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METAL SHOW PROGRAM

The Mechanical Properties of Swaged Iodide-Base Chromium and Chromium Alloys—D. J. Maykuth, Asst. Div. Consultant, and R. I. Jaffe, Chief, Nonferrous Physical Metallurgy Div., Battelle Memorial Inst., Columbus, O.

Effect of Dispersion of Alpha Phase on the High Temperature Fatigue Properties of Alpha-Beta Brass—J. E. Breen, High Temp. Alloys Br., Naval Research Lab., Washington, D. C., and J. R. Lane, Met., National Research Council, Washington, D. C.

Aging Reactions in Certain Super Alloys—W. C. Hagel and H. J. Beattie, Jr., Materials & Processes Lab., General Electric Co., Schenectady.

1956 LECTURE COURSE

All Sessions in Hotel Statler

SPECIAL MEETINGS

Tuesday, October 9

AIME Annual Banquet
Hotel Carter

Wednesday, October 10

ASM ANNUAL MEETING
Campbell Memorial Lecture
Dr. C. S. Barrett
Hotel Statler

Wednesday, October 10

AWS Annual Dinner
Hotel Cleveland

Wednesday, October 10

SNDT ANNUAL MEETING
Mehl Honor Lecture
M. L. Mochel
Hotel Hollenden

Thursday, October 11

ASM ANNUAL DINNER
Dr. J. R. Dunning, Speaker
Hotel Statler

EFFECT OF RESIDUAL ELEMENTS OF THE PROPERTIES OF METALS

Monday, Oct. 8—10:30 a.m.

Fundamental Considerations (structure—formation of a second phases effect of soluble elements and second phases upon properties)— E. R. Parker, University of California.

Monday, Oct. 8—2:00 p.m.

Non-Ferrous Structural Alloys (aluminum, magnesium, copper and nickel)—F. N. Rhines, Carnegie Institute of Technology.

Tuesday, Oct. 9—9:30 a.m.

Iron and Steel—J. W. Halley, Inland Steel Co., East Chicago, Ind.

Semiconductors (silicon, germanium and others)—J. H. Scaff, Bell Telephone Laboratories, Murray Hill, N. J. (In Mr. Scaff's absence, presented by W. G. Pfann.)

Tuesday, Oct. 9—2:00 p.m.

Refractory Alloys (titanium, molybdenum, zirconium and chromium)—D. J. McPherson, Armour Research Foundation.

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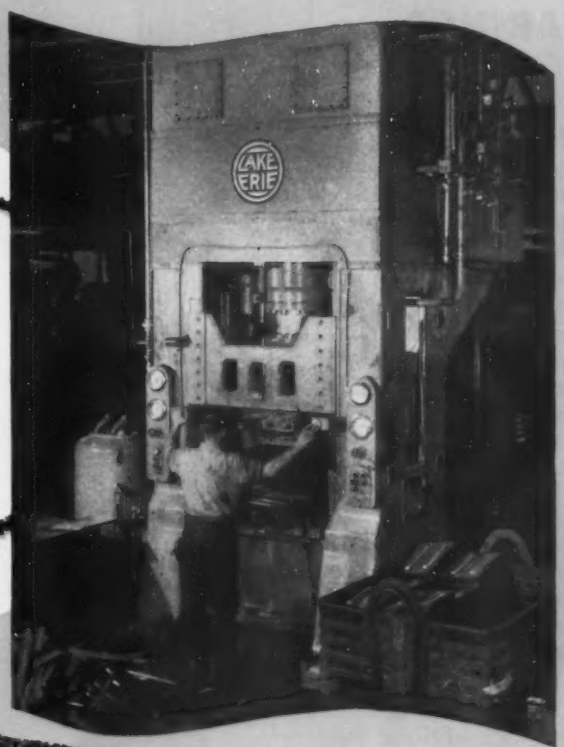

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PROGRAM

FATIGUE ENDURANCE OF CARBURIZED STEEL

(Delivered by Metallurgy Section staff members, General Motors Research Center, Detroit.)

Thursday, Oct. 11—9:30 a.m.

Introduction—J. B. Bidwell.

Physical Metallurgy of Carburized Steels—G. H. Robinson.

Thursday, Oct. 11—2:00 p.m.

Residual Stresses in Carburized Steels—W. S. Coleman.

Fatigue Durability of Carburized Steels—R. L. Mattson.

Summary—R. F. Thomson.

ATOMIC ENERGY COMMISSION—AMERICAN SOCIETY FOR METALS

JOINT AUSPICES

All sessions in Hotel Carter

THE SCOPE OF THE METAL THORIUM

Thurday, Oct. 11—9:30 a.m.

Chairmen: F. H. Spedding, Director, Institute for Atomic Research, Ames Laboratory, U. S. Atomic Energy Commission, Ames, Ia.; Edward Epremian, Chief, Metallurgy and Materials Branch, Division of Research, U. S. Atomic Energy Commission, Washington, D. C.

The Role of Thorium Metal in the Nuclear Field—J. P. Howe, Atomics International, Downey, Calif.

Non-Nuclear Applications of Thorium Metal Other Than in Magnesium Technology—W. C. Lilliendahl, Westinghouse Electric Corp., Bloomfield, N. J.

The Uses of Thorium in Magnesium Technology—T. E. Leontis, Dow Chemical Co., Midland, Mich.

The Production of Thorium Compounds—Morton Smutz and John Barghusen, Ames (Ia.) Laboratory, Atomic Energy Commission.

Development of Thorium Tetrafluoride-Calcium Process for Thorium

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Metal—Harley A. Wilhelm, Ames (Ia.) Laboratory, Atomic Energy Commission.

Consumable-Electrode Arc Melting of Thorium—A. H. Roberson, U. S. Bureau of Mines, Albany, Ore.

Powder Metallurgy of Thorium (Including Reduction of Thorium Oxide by Calcium)—B. Kopelman, Sylvania Electric Co., Bayside, N. Y.

Spectrographic Analysis of Thorium Metal—V. A. Fassel and Edward DeKalb, Ames (Ia.) Laboratory, Atomic Energy Commission.

Chemical Analysis of Thorium Metal—C. J. Rodden and Morris W. Lerner, New Brunswick (N. J.) Laboratory, Atomic Energy Commission.

Purification of Thorium Metal by the Iodide or Hot-Wire Process, by Ivor E. Campbell, Battelle Memorial Institute, Columbus, O.

The Electrolytic Refining of Thorium—R. A. Noland, Argonne National Laboratory, Lemont, Ill.

Thursday, Oct. 11—2:00 p.m.

Chairmen: R. C. Dalzell, Assistant Director, Engineering Development Branch, U. S. Atomic Energy Commission, Washington, D. C.; H. A. Wilhelm, Associate Director, Institute for Atomic Research, Ames Laboratory, U. S. Atomic Energy Commission, Ames, Ia.

Physical Constants, Crystal Structure and Thermodynamic Properties—J. F. Smith, Ames (Ia.) Laboratory, Atomic Energy Commission.

Atomic Structure of Thorium, Its Electron Energy and Other Considerations as to Solid State Physics—T. G. Berlincourt, Atomics International, Downey, Calif.

Preferred Orientation in Thorium—L. K. Jetter and C. J. McHargue, Oak Ridge National Laboratory, Oak Ridge, Tenn.

Fabrication and Cladding of Thorium Metal—J. H. Frye and Jack Cunningham, Oak Ridge National Laboratory, Oak Ridge, Tenn.

Recrystallization and Grain Growth in Thorium Metal—E. J. Boyle Electro Metallurgical Co., Niagara Falls, N. Y.

Mechanical Properties of Thorium Metal and High-Thorium Alloys—John Milko and R. E. Adams, Oak Ridge National Laboratory.

Corrosion Resistance of Thorium Metal and High-Thorium Alloys, by H. A. Pray and associates, Battelle Memorial Institute, Columbus, O.

Metallography of Thorium—H. P. Roth, Nuclear Metals, Inc., Cambridge, Mass.

Irradiation Damage in Thorium Metal—F. G. Foote, Argonne National Laboratory, Lemont, Ill.

Thorium Alloy Systems—H. A. Saller and F. A. Rough, Battelle Memorial Institute, Columbus, O.

Hazards Associated With Thorium Metallurgy—Adolph Voigt and Milo Voss, Ames (Ia.) Laboratory, Atomic Energy Commission.

(Turn to page 259)

EPOCAST
epoxy resins

EPOCAST 9-B is a two component resilient casting resin that cures at room temperature and utilizes safety hardeners for your protection. It is possible to adjust the qualities of this material from tough resiliency to soft rubber-like consistency. (Shore D hardness range 30 to 70). For information on high impact, resilient tools, write for Bulletin EP-56-36.

EPOCAST 9B

EPOCAST 11-B is a black casting resin that can be poured two to three feet thick without generating excessive exothermic heat, and yet be cured at room temperature.
This resin is also suitable as a replacement for thermoplastic draw rings, hammer forms, flexible forming snakes, thick cores, and all other type castings of unlimited thickness.
Write for bulletin EP-55-42 (Mod. 5).

EPOCAST 11B

furane plastics
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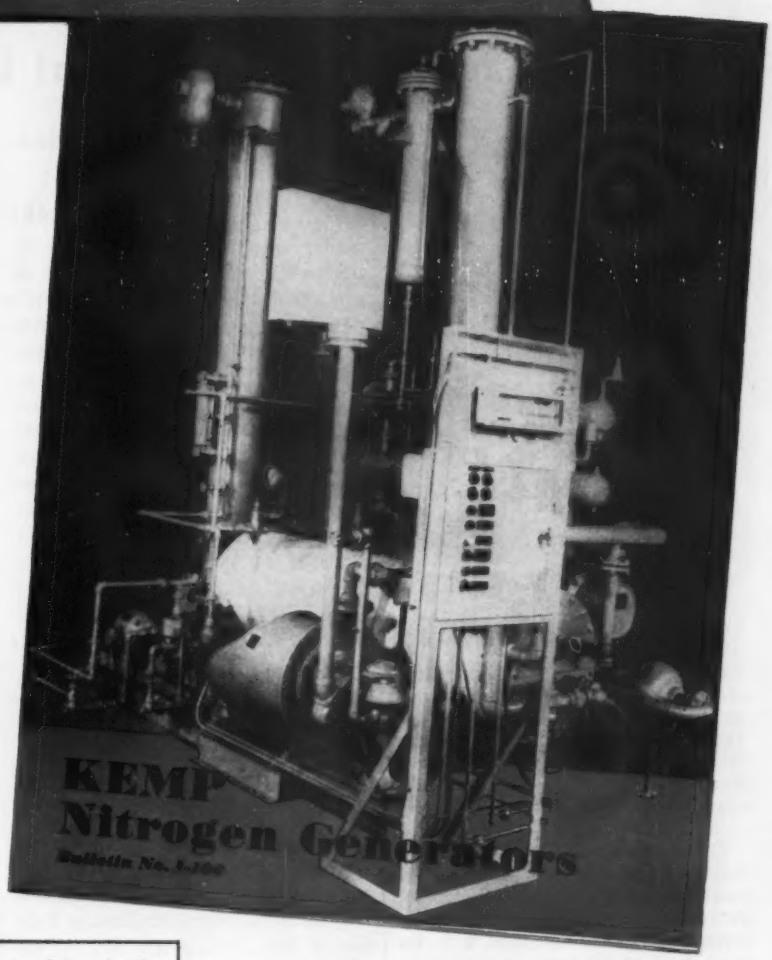
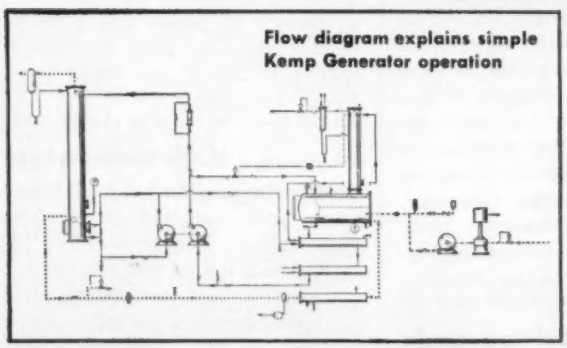
If you use Nitrogen as a Protective Atmosphere in Heat Treating . . .

this *NEW* Bulletin shows how KEMP N_2 Generators slash operating costs, increase quality!





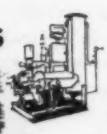
Flow diagram explains simple Kemp Generator operation

Send today for your free Kemp Nitrogen Generator Bulletin No. I-100. It's packed with valuable information on how you can improve your inert gas operation by switching to Kemp Generators.

Bulletin contains complete operation procedure, design features, composition chart, data chart and a detailed flow diagram. In addition, you receive an inquiry data sheet that you may fill in and send to Kemp, at no cost to you, for a free evaluation.

Also available at no cost to you, the Kemp Inert Gas Generator Bulletin No. I-10. Check below for the bulletin(s) you would like sent to you.

ATMOS GAS GENERATORS



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☐ I-100 ☐ I-10

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I'm not a wise guy, but I do know about the service these Garrett plants give you. Seems hard to believe. Those fellows bend over backwards to help you out in an emergency. And their regular service means you always get deliveries when promised ... sometimes before.

Of course, when it comes to quality they are tops on lock washers, flat washers, spring washers, hose clamps, stampings and assemblies. They have three plants equipped with the most modern high-speed automatic machinery to turn out billions of parts to exact specification . . . complete heat treating, plating and finishing facilities. If you don't believe me, next time send your order into Garrett. You'll see why their customers say YOU CAN'T BEAT GARRETT.

LOCK WASHERS
FLAT WASHERS
HOSE CLAMPS
STAMPINGS

Manufactured by

GEORGE K. GARRETT CO., Inc.
Philadelphia 34, Pa.

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OF PHILADELPHIA

FREE AIDS

New Technical Literature:

Catalogs and Bulletins

Ram trucks

Heavy duty ram trucks, with capacities from 20,000 to 80,000 lb, are illustrated and described in a new four page folder. They feature power hydraulic wheel brakes, hydraulic power steering, dual drive motors, clear operator vision and narrow overall width. Simplified maintenance, designed to reduce truck downtime, is another important feature of the new line. Literature contains detailed specifications of seven models plus engineering drawings providing truck operating information. Additional illustrations show specific application views. Main components are pictured and described. *The Elwell-Parker Electric Co.*

For free copy circle No. 41 on postcard, p. 257

Resistance welding

"Resistance Welding At Work," covers the use of a firm's resistance welding techniques to fabricate miter joint aluminum window frames at the Reynolds Metals Fabcating Div., Louisville, Ky. "Production has increased 66 pct," it says, "manufacturing cost of each window frame has dropped 25 pct, and labor demand has been reduced 43 pct." Other sections illustrate a sequence of operation with a new fastening technique. Also discussed are material specifications, machine settings and destruction testing. *Sciaky Bros.*

For free copy circle No. 42 on postcard, p. 257

Cutting tools

Aluminum oxide cutting metals, tool tips, throw-away inserts, cylinders and other machine turning and cutting tools are described in a new 12 page catalog. It includes technical data on aluminum oxide, recommended applications and machining practices, dimensions of standard tools and instructions for grinding them. *The Metal Carbides Corp.*

For free copy circle No. 43 on postcard, p. 257

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 257.

Vibration analysis

Single page catalog sheet illustrates and describes a new one-third octave filter set. The instrument is specially designed for sound and vibration analysis, measurement of sound transmission and reverberation time, and in general, any audio signal analysis or telemetry data reduction. It consists of 27 flat-topped filters of ⅓ octave band pass width with seven additional filters available as optional equipment. Besides the band pass filters, the instrument contains the standardized weighting networks for overall loudness measurements in phons and a linear band pass. The filter response is within ± 2db of the linear level. *Brush Electronics Co.*

For free copy circle No. 44 on postcard, p. 257

High luster steel

Cold drawn steel with a high luster finish gets analyzed in a four page folder. The product is described as a low carbon sulphurized and phosphorized open hearth steel containing a minute quantity (about 0.25 pct) of lead. Added by a special process during the teeming of the ingot, the lead is uniformly dispersed. "This small lead addition does amazing things to the steel," the literature states. "Yet it doesn't detract from its mechanical and metallurgical qualities." Advantages listed include: increased production rate, longer tool life, better finish and reduced machining costs. *Bliss & Laughlin.*

For free copy circle No. 45 on postcard, p. 257

Window panes

Colored, shatterproof window panes are making their bid for installation in industrial plants. A single page data sheet tells how these can improve lighting standards in the daytime. Coming in cool green, light rose and light blue colors, panes are easily installed and shatterproof. Literature explains how translucent panes diffuse light through their built-in color. Made of flat fiberglas, they present a product well worth looking into. Safety engineers, building maintenance men, builders and management men in general might find almost unlimited possibilities. *Alsynite Co. of America.*

For free copy circle No. 46 on postcard, p. 257

Lift truck

Extreme heavy duty operations can be handled with a new 2500 lb lift truck, especially when the operation involves constant stopping and starting. This materials handler is described in a recently issued publication. It states that the unit's traction speed is 4.5 mph with a full load and 5.0 mph empty with three speeds forward and reverse, plus timed acceleration. The truck has a lift speed of 25 fpm loaded and an operating weight of 4300 lb. The folder says the model is especially adaptable for working in and out of trailer trucks and elevators and can stack in aisles only 110-¾ in. wide. New higher voltage allows more work capacity and keeps maintenance down. *Lewis-Shepard Products, Inc.*

For free copy circle No. 47 on postcard, p. 257

Noise control

Increased production is promised through noise and vibration control in a new publication. It attempts to show by means of case histories how profits and production can be increased through the modern concept of vibration and noise control machinery mountings. Illustrated guide to increasing production describes how one company's mountings permit efficient plant layout, make possible utilization of all available space, prevent rejects, and eliminate down-time. It also offers theories on cutting employee absenteeism. *The Korfund Co., Inc.*

For free copy circle No. 48 on postcard, p. 257

FOR IMPROVED FURNACE CIRCULATION

Through the use of a THERMAL High Velocity burner production for a given size furnace can be substantially increased or furnace size for a given rate or production can be decreased.

high velocity burners by THERMAL

(1) Combustion 90% completed within the burner itself.

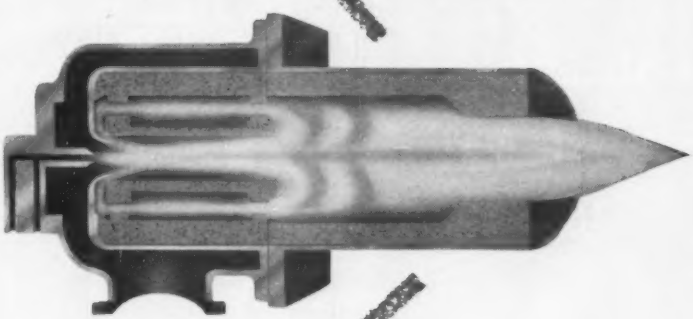
(2) Convection is a predominant means of heat transfer.

(3) High exit velocities (300 to 500 ft/sec) of products of combustion.

(4) Identical flame characteristics with oil, gas or combination gas-oil burner.

(5) Heat release rates of 10,000,000 BTU/hr/cu ft of combustion space.

(6) Flame length, regardless of fuel used is seldom more than one foot in length.



By proper utilization of the THERMAL burner characteristics of high velocity, high temperature, non-luminous flame, remarkable results have been obtained in furnaces, kilns, ovens and heat exchange equipment of all types. Let us analyze the effects possible in your facilities or describe the specialized heat equipment designed and built by THERMAL. Write for Bulletin No. 108.

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Gas, Oil & Combination Burners • Heat Exchangers • Air Heaters • Submerged Combustion • Combustion & Heat Transfer Equipment

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FERROUS AND NON-FERROUS CENTRIFUGALLY CAST SLEEVES, ROLLS, LINERS, TUBES, RETORTS, CHUTES, RINGS, BUSHINGS, BEARINGS, ETC.

The success of a centrifugal casting is often determined long before the metal is melted and the casting formed. At Chief Sandusky, it starts in the research laboratories where experienced technicians are continually searching to improve existing methods and develop new ones to meet your specialized needs.

Each casting is then quality controlled through every step of the production process. The result of this supporting and preceding control is a finer, closer grained product which resists heat, corrosion, and abrasion.

Whatever your needs in ferrous and non-ferrous centrifugal castings—or in the way of technical aid or information, call on Chief Sandusky . . . continual leader in its field, continually improving its service to you.

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Chief SANDUSKY CENTRIFUGAL CASTINGS

FERROUS AND NON-FERROUS

SANDUSKY FOUNDRY AND MACHINE CO., Sandusky, Ohio

FREE TECHNICAL LITERATURE

Ingot stripper

Low-cost operations and time-saving functions of a portable hydraulic ingot stripper are described in a folder just published. This is the first time that all of the material on this particular portable ingot stripper has been collected in one piece of literature. Folder gives diagrams of two standard sizes and includes descriptive material on each, including photographs of the ingot strippers in use. Any present crane having a capacity to lift the ingot, mold and stripper can be quickly converted into a stripper crane at low initial cost, says the folder. *Pittsburgh Engineering & Machine Co.*

For free copy circle No. 49 on postcard, p. 257

Control systems

Panel control systems for all automatic oil, gas and combination oil/gas burners appear in a new 16 page bulletin. It contains information on each packaged control system for both commercial and industrial burners. Included is application, operation and component data, as well as dimensions. A concise selector guide is also presented. This enables specifying engineers, dealers, architects and all others to quickly select the appropriate panel control system for any application. *Combustion Control Div., Electronics Corp. of America.*

For free copy circle No. 50 on postcard, p. 257

Cap screws

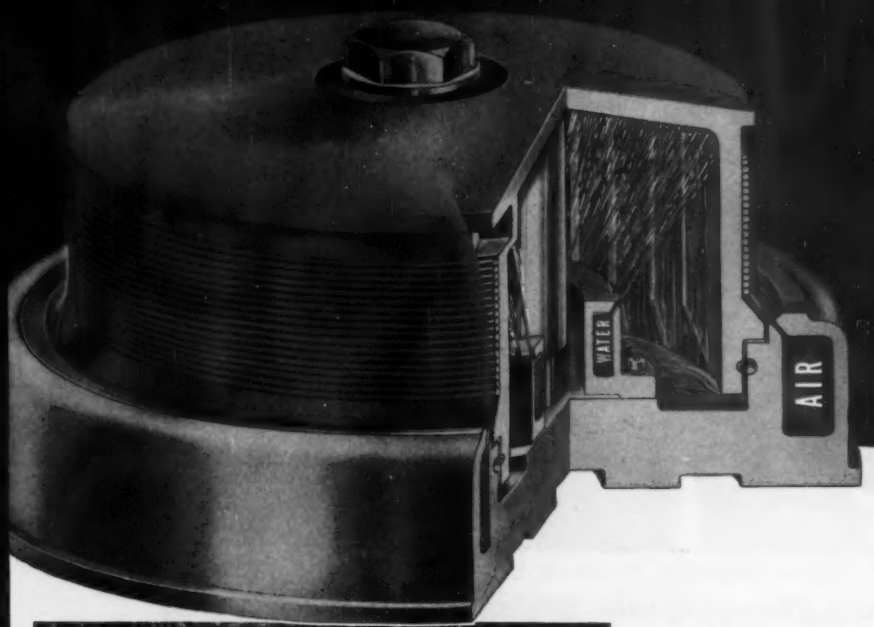
Consumer and distributor net pricing books, covering a fastener manufacturer's products, have been made available. This is said to be the first time in the cap screw industry that a company, falling in step with an increasing industrial trend, abandoned list prices and discounts in favor of a net pricing policy. The net pricing schedules, 24 page books, product indexed, are designed for legibility. Prices are in bold-face type. Immediately below them, quantities, both in package and bulk, are stated in lighter type. Adroit use of white space makes for easy reading of the price and quantity figures, the diameters and lengths of product. *Cleveland Cap Screw Co.*

For free copy circle No. 51 on postcard, p. 257

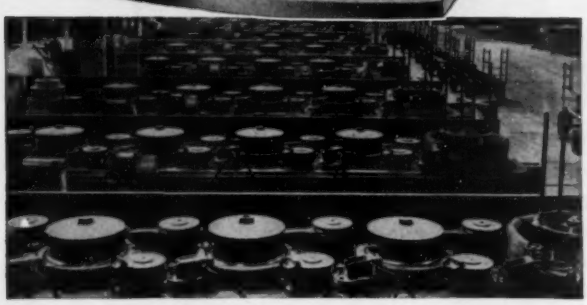
Vaughn® MOTOBLOC® MOTOBLOX®

Double-Cooled

with AIR and WATER



for perfect wire condition from start to finish!



Vaughn DOUBLE-COOLED blocks insure desirable temperatures for high carbon wire all the way through the draw—thanks to advanced engineering that provides *both* air and water cooling. Each block is equipped with an annular air blast for external cooling of the wire, while water jets impinging on the inner finned block walls remove heat continuously and effectively.

• ***Let us discuss the benefits to your wire on your operation!***

The Vaughn Machinery Co., Cuyahoga Falls, Ohio, U. S. A.

"Quick on the Draw!"

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

MR. JAMES T. RICCELLI

Poured

Making high quality leaded alloy steels is no tea party. The planning, the constant scientific study, the checking of minute details by skilled metallurgists and workmen that goes into the creation of one billet of leaded steel represent one of the highest forms of industrial craftsmanship. That is why Copperweld, manufacturer of the most diversified lines of lead-treated alloy and carbon steels, is recognized leader in the manufacture of hot-rolled blooms, bars and billets.

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY • Steel Division • Warren, Ohio

EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 252.

Punch presses

Increased tonnage capacities are announced for a new line of punch presses in a new eight page brochure. These range from two, through five, to eight tons. The booklet says that these machines make short work of stamping, forming, punching, marking, riveting, staking, shearing, piercing, embossing, et. al. A new clutch is also described. Included is a listing of 18 features contained in the series. A page of specifications also appears in the booklet. *Benchmaster Mfg. Co.*

For free copy circle No. 52 on postcard, p. 257

Color meter

Color theory, accuracy and features of one company's automatic color difference meter with an electronic amplifier and motors is described in a new two-page technical data sheet. Three-part numerical comparison of color samples is given by the meter. *Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 53 on postcard, p. 257

Handling products

Latest trends in lift truck design are shown in a new dozen page brochure of industrial lift trucks. Illustrated in two colors, the booklet is designed for quick reference of 25 different Hyster industrial truck models ranging in capacity from 1000 to 30,000 lb. Spotlighted are new 3000, 4000 and 5000 lb capacity trucks on pneumatic tires, and a space saver series of the same capacity on cushion tires. A yard crane of 10,000 lb capacity is also described. Booklet also illustrates several popular lift attachments. *Hyster Co.*

For free copy circle No. 54 on postcard, p. 257

Dust collector

Mechanical rather than electrostatic, a multiple tube dust collector is described in a new booklet. Two pages include information and charts giving facts on the collector's efficiency and capacity. Several pages cover dimensions in both table and drawing forms. The brochure says the collector's new design has all the inherent advantages of multiple tube collectors over conventional type cyclones plus the added advantages of greater separating forces and reduction in overall resistance or pressure drop. *Research-Cottrell, Inc.*

For free copy circle No. 55 on postcard, p. 257

Hot spraying

Major benefits of hot spray application of finishing materials is explained in a new phamphlet. Case histories are cited to illustrate each benefit. Another section deals with questions and answers. Most frequently asked questions about hot spray are listed, with detailed answers. Booklet is illustrated with photographs and drawings. *The Spee-Flo Co.*

For free copy circle No. 56 on postcard, p. 257

Polyethylene pipe

Flexible polyethylene plastic pipe and fittings are described in an eight page bulletin. Contents include: applications for the pipe, sizes of standard pipe and fittings, installation instructions, technical properties, and estimated flow rates for water in various pipe sizes. The piping, of non-toxic, virgin polyethylene, is approved by the National Sanitation Foundation for use with drinking water. *American Hard Rubber Co.*

For free copy circle No. 57 on postcard, p. 257

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **9/27/56**

Circle numbers for Free Technical Literature or Information on New Equipment:

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31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80

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FREE TECHNICAL LITERATURE

Irradiated polyethylene

A 12 page, illustrated technical report on irradiated polyethylene has been published. It is described as a unique insulating material which combines over-load protection with the exceptional electrical and physical properties of conventional polyethylene. The brochure cites other outstanding properties of the insulating material, including moisture and chemical resistance, encapsulation ability and thermal stability. Also described are performance characteristics, typical applications and techniques of use. General purpose grades of the irradiated insulating material are available in tape or film form, in widths from ½" to 12". They can be supplied in two, five, or ten mil thicknesses. *Chemical Development Dept., General Electric Co.*

For free copy circle No. 58 on postcard, p. 257

Forgings

Brass, bronze and aluminum forgings' design, properties and applications are covered in a fact-packed, colorfully illustrated booklet. Containing 32 pages plus covers, it possesses important data on forgings, a comprehensive listing of forging terms, and numerous illustrations on the subjects. Its contents include: an explanation of forging, hot pressed brass forgings, one company's dies and alloys, how they are made, where they are used, type, tolerances, design factors, machined forgings and much more. The publication sparkles with attractive text, charts, listings and color photographs. *Titan Metal Mfg. Co.*

For free copy circle No. 59 on postcard, p. 257

Heat exchangers

Fin-tube heat exchangers are described in a new two color, eight page bulletin. It covers the heat-transfer characteristics of the longitudinal fin tubes. These feature U-shaped fin channels integrally bonded to the tubes by heliarc welding. Included is a table of dimensions, a type designation table and finside coefficient and finside pressure-drop charts for all sizes of exchangers. *Alco Products.*

For free copy circle No. 60 on postcard, p. 257

Drip-proof motor

Open drip-proof motors in NEMA rerated ratings of ½ to 40 hp and in non-rerated ratings of ½ to 100 hp are described in a new bulletin. New features of the rerated motors include a diagonally split cast iron conduit box for increased accessibility and wiring ease, leads with attached metal markers and positioned by number for ease in making connections. In addition to cutaway views of the motor, bulletin includes tables of ratings and dimensions. *Allis-Chalmers Mfg. Co.*

For free copy circle No. 61 on postcard, p. 257

Gas appliances

A new products catalog pictures and describes a line of furnaces, burners, valves, torches, mixers, blowers, stock tank heaters and controls. Specifications and shipping weights are listed for each item. The catalog brings customers up to date on recent changes. A few items have been eliminated, specifications have been altered on others. *Johnson Gas Appliance Co.*

For free copy circle No. 62 on postcard, p. 257

Customer report

"Your Next Move for Profit and Progress" is the title of a new 20 page catalog reviewing one company's facilities. Included is an explanation of the services provided, along with the firm's developments in testing, inspection, detection and research. Listed are sections including information on: analog and digital systems, new product development, perfecting new methods, testing new models, basic research and development, future planning, counting and sorting molecules, process monitoring and control, leak detection, research and control analysis, air-pollution control, strategy for automation, dynamic testing, chemical analysis, process monitoring and control, vacuum, production leak testing, thin metal coating, high speed coating and sealing, optical coating, vacuum metallurgy, vacuum drying business planning and analysis, engineering computation and process montoring and control. *Consolidated Electrodynamics Corp.*

For free copy circle No. 63 on postcard, p. 257

When a Lassie meets a Massey

Coming through the Rye

Massey-Harris-Ferguson that is, neighbor, whom you'll find in the rye and the wheat and all over farms 'round the world — because M-H-F products are vital to profits in farming.

And at Massey-Harris-Ferguson resistance welding is just as vital to profits in manufacturing.

The combination of ingenious production engineering and Sciaky resistance welding techniques achieves economy usually associated with mass production . . . *but* it achieves this economy on short runs of a wide variety of parts!

If *you* want to combine mass production economies with short production runs . . . look into Sciaky resistance welding — just like Massey-Harris-Ferguson did!

SCIAKY®

Largest Manufacturers of Resistance Welding Machines in the World

One of Massey - Harris - Ferguson's proudest achievements — the 90 Custom Special Self-propelled Combine.

Turn the page—Take a look for yourself at just a few of the advantages . . .

DRAW BAR AND KEEPER—Save 19¢ each over arc welding

BELL CRANK—Save 65¢ each over arc welding

YOKE—Save 83.75¢ each over arc welding; more satisfactory product

CRANK—Save $29 per hour of production over castings

LATCH — Save 4.29¢ each over arc welding

SPROCKET—Save $17.60 per hour of production over arc welding

UNIVERSAL—Save $19.40 per hour of production over arc welding

BEARING — Save over $1.00 each over casting

BELT TIGHTENER—Save $1.24 each over brazing

Mass Production Methods with Sciaky Techniques

save up to 60% on short run fabrication

Impressive cost reductions are only part of the Massey-Harris-Ferguson story — versatility, speed, and quality combine to result in an unusual success with a wide variety of short run applications.

Over 200 assemblies, formerly fusion welded, cast, or forged, are now made from standard, off-the-shelf stock and screw machine products. Average set-up time for resistance welding is only *30 minutes*. Fixturing costs have been reduced to less than $75.00. The field performance has been excellent!

Three standard Sciaky Three-Phase balanced load welders are used by M-H-F. Control set-ups for any job are quickly made from performance data charts. Production time is never wasted in try-out to prove weld quality.

"Resistance Welding At Work", Vol. 5, No. 1, tells the whole M-H-F story. Write for your free copy of this dramatic proof of Sciaky Basic design thinking — resistance welding techniques to put the profits back into manufacturing.

For specification welding such as required for air frame, jet engine and ordnance manufacture ask about the new Sciaky Predetermined Electronic Counter Weld Control.

One of three standard Sciaky welders in use at M-H-F showing the fixturing for producing a yoke.

Largest Manufacturers of Electric Resistance Welding Machines in the World

SCIAKY.

Sciaky Bros., Inc., 4924 W. 67th Street, Chicago 38, Illinois, POrtsmouth 7-5600

PROGRAM

(Continued from p. 250)

INSTITUTE OF METALS DIV.—AIME

All sessions at Hotel Carter in locations noted

(Abstracts of papers will not be published but will be available in mimeographed form at the registration desk during the meeting.)

Monday, Oct. 8—9:00 a.m.

Petit Cafe

RESEARCH IN PROGRESS

Co-chairmen: C. D. Cullity and Paul Gordon

Monday, Oct. 8—9:00 a.m.

Grand Ballroom

RESEARCH SEMINAR—EMBRITTLEMENT

Co-chairmen: W. R. Hibbard, Jr. and J. P. Nielsen

Effect of Hydrogen on Alpha Titanium Alloys—G. A. Lenning, Titanium Metals Corp. of America; J. W. Spretnak, Ohio State University, and R. I. Jaffee, Battelle Memorial Institute.

Upper-Nose Temper Embrittlement of a Nickel-Chromium Steel—L. D. Jaffe and D. C. Buffum, Jet Propulsion Laboratory, California Institute of Technology.

On the Nature of Embrittlement Occurring While Tempering a Nickel-Chromium Alloy Steel—G. Bhat, Crucible Steel Co. of America, and J. F. Libsch, Lehigh University.

Observations on the Mechanical Properties of Hydrogenated Vanadium—B. W. Roberts and H. C. Rogers, General Electric Co.

Effect of Small Amounts of Alloying Elements on the Ductility of Cast Molybdenum—L. E. Olds and G. W. P. Rengstorff, Battelle Memorial Institute.

Monday, Oct. 8—2:00 p.m.

Grand Ballroom

PRESS THE TRIGGER—

and Chobert® Automatic Riveting saves time—cuts material costs!

North American Aviation Inc. use of Chobert system in blind application proves it!

Chobert Automatic Riveter.

An alert suggestion to replace stem and explosive type rivets with the Chobert Automatic Riveting System on a blind skin-to-frame joining operation saves North American Aviation 21.45 man minutes per unit. Poor uniformity with other rivets and time spent trimming and resetting are eliminated by using Chobert Blind Rivets—which cost, less too! A well known high-production riveting system in commercial fields, Chobert is recognized for outstanding results in the airframe industry.

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The Chobert Blind Rivet has a tapered hollow shank through which a mandrel can be placed. This mandrel is loaded into a pneumatic riveting gun. The rivet, with the installed mandrel, is placed in the pre-drilled hole in the material. When the trigger on the pneumatic riveting gun is depressed, the mandrel is withdrawn through the rivet shank locking the rivet securely in place in the structure.

Let Chobert work and save for you now—get full details by writing for Chobert Automatic Riveting System brochure.

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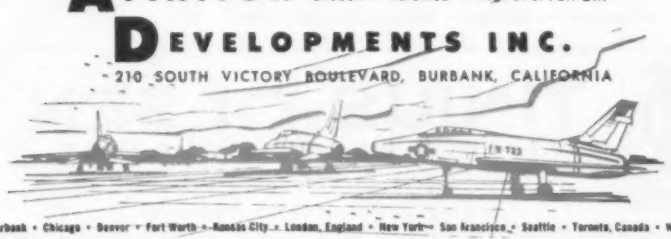

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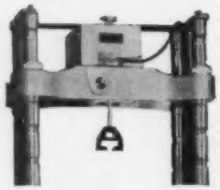

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PROGRAM

SYMPOSIUM ON NUCLEAR METALLURGY

Co-chairmen: Edward Epremian and A. E. Kaufman

Theory and Mechanism of Radiation Effects in Metals—G. H. Vineyard, Brookhaven National Laboratory.

Irradiation Effects on Physical Metallurgical Processes—D. E. Thomas, Westinghouse Electric Corp.

Irradiation Effects in Reactor Materials—Douglas Billington, Oak Ridge National Laboratory.

Monday, Oct. 8—2:00 p.m.

Petit Cafe

RESEARCH SUMMARIES—MECHANICAL PROPERTIES

Co-chairmen: W. J. Harris, Jr., and R. W. Fountain

Influence of Silicon and Aluminum on the Properties of Hot-Rolled Steels—R. H. Frazier, F. W. Boulger, and C. H. Lorig, Battelle Memorial Institute.

Creep of Polycrystalline Nickel—J. Weertman and P. Schahinian, Naval Research Laboratory.

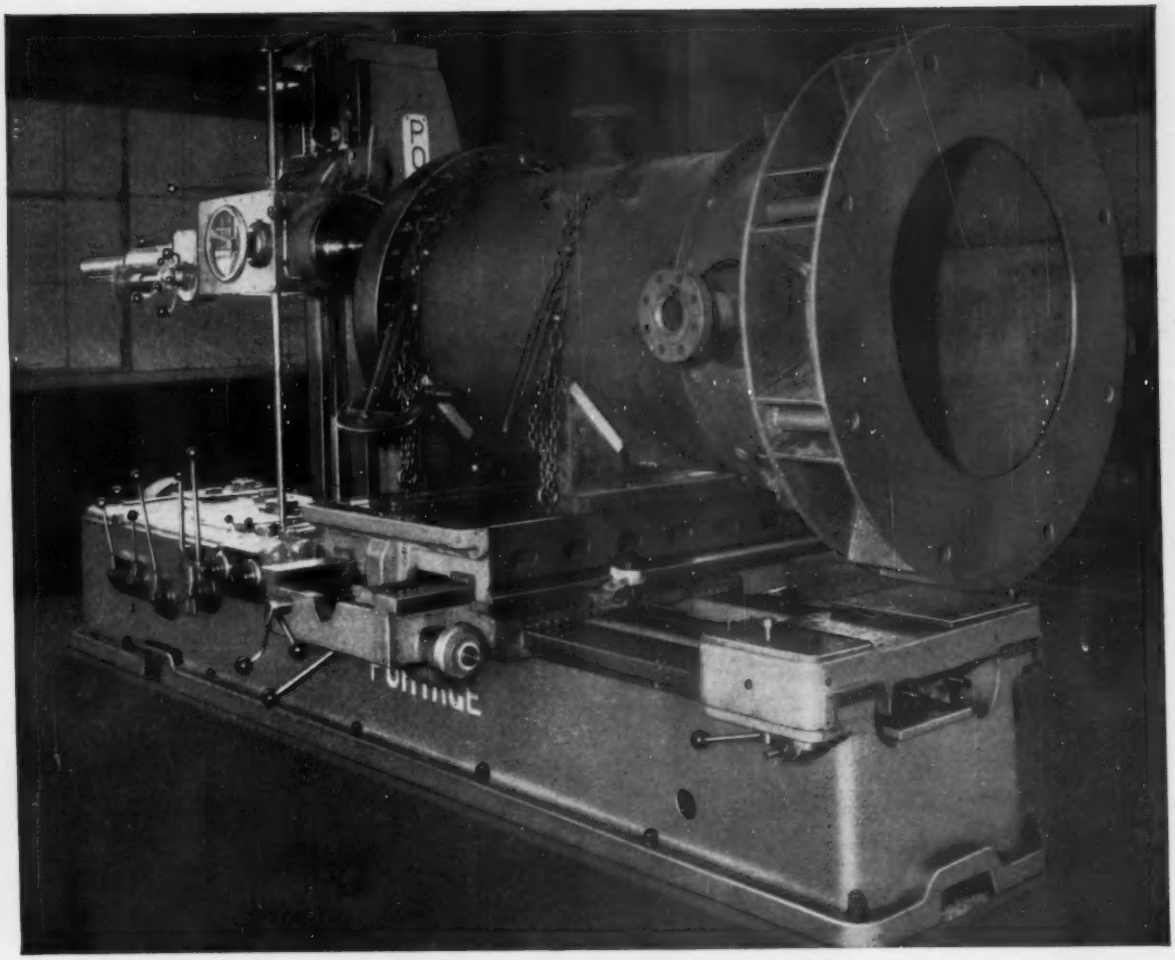
Study of the Effect of Gases on the Melting, Casting, and Working of Palladium—R. H. Atkinson, International Nickel Co., Inc. (retired)

Ti-36% Al as a Base for High-Temperature Alloys—J. B. McAndrew, Armour Research Foundation, and H. D. Kessler, Titanium Metals Corp. of America.

Effect of Mo, W, and V on the High-Temperature Rupture Strength of Ferritic Steel—A. E. Powers, General Electric Co.

High-Strength Zirconium Alloy: Zirconium + 4 w/o Tin + 1.6 w/o Molybdenum, by Walston Chubb, Battelle Memorial Institute.

Creep of Single Crystals and Polycrystals of Aluminum, Lead, and Tin—C. D. Wiseman, O. D. Sherby, and J. E. Dorn, University of California



Photograph courtesy of Western Supply Company, Tulsa, Oklahoma

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"Our manufacturing facilities here at Western are devoted almost entirely to heat exchanger production. We have found the versatility of the Portage Mills allows us to do a wide variety of machining operations required in the fabrication of this type of work. We have found the machine to be very reliable and have experienced no lost time for repairs since it was installed."

Mr. Brady's kind remarks are typical of those coming in from across the country ... PORTAGE MILLS are truly the *machine of the year* ... and remember ... Portage costs less to buy. Write for the illustrated catalog ... and ask for a proposal too!

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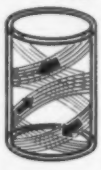
How MICROHONING Makes a Gas-Tight Running Seal Without Piston Rings

A leak-free, running seal between bores and pistons—without the use of rings—is possible only when the processing method generates diametric and geometric accuracy and the required functional surface finish. These characteristics are simultaneously obtained by the Microhoning process. Here's how:

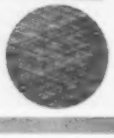
1 The sticks of abrasives in the tool form an abrasive "cylinder" and are fed out radially with equal pressure in all directions. High spots and tight areas in the bore are abraded first.

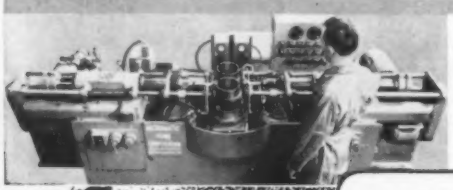
2 The long abrasive sticks cut only on the crests of wavy or snaky surfaces until the bore has the same diameter throughout its full length.



3 The combination of tool motion (rotation and reciprocation) and feed pressure fractures the abrasive grits that have become dull, and new sharp edges are formed; the clean constant cutting action of every stroke on the full bore length consistently generates the desired surface finish.

One of the exclusive advantages of Microhoning is its ability to produce whatever functional surface characteristics are required for maximum product performance. Microhoning's cross-hatch pattern, with its myriad of minute intersecting "valleys," furnishes an excellent surface for retention of lubrication.





"Here's one of two Micromatic Model 523-2 machines used on the compressor crankcase job. Tecumseh uses a total of 18 Microhoning machines on other vital processing operations."

The principles and applications of Microhoning are thoroughly explained in an informative 16mm., 30-minute sound movie, "Progress in Precision." We'll be glad to reserve a print for your use. Just tell us on the coupon the date you'd like to see it.

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Effect of Melting and Casting Atmospheres on the Stress-Rupture Properties of Cast Nickel-Base Alloys—C. M. Hammond and R. A. Flinn, University of Michigan.

Aging in Complex Commercial Nickel-Chromium Alloys Hardened With Titanium and Aluminum—R. F. Wilde, General Electric Co., and N. J. Grant, Massachusetts Institute of Technology.

Effect of Orientation on the Plastic Deformation of Aluminum Single Crystals and Bicrystals—R. S. Davis, R. L. Fleisher, J. D. Livingston, and Bruce Chalmers, Harvard University.

Tuesday, Oct. 9—9:00 a.m.

Petit Cafe

RESEARCH SEMINAR—CRYSTALLINE IMPERFECTIONS AND MECHANICAL BEHAVIOR

Co-chairmen: Jack Washburn and Robert Maddin

Delayed Yielding in a Substitutional Solid Solution Alloy—L. A. Shepard and J. E. Dorn, University of California.

Control of Strain Aging in Alpha Iron—E. R. Morgan, Jones and Laughlin Steel Corp., and J. C. Shyne, Ford Motor Co.

Recovery of Cold-Worked High-Purity Aluminum-Magnesium Alloys—E. C. W. Perryman, Atomic Energy of Canada, Ltd.

Temperature Dependence of Annealing Phenomena in a Cold Rolled Aluminum Single Crystal—A. H. Lutts and P. A. Beck, University of Illinois.

Investigation of the Effect of Solutes on the Grain Boundary Stress Relaxation Phenomenon — S. Weinig, New York University, and E. S. Machlin, Columbia University.

Some Observations on the Structure of Grain Boundary Fracture Surfaces—H. C. Chang and N. J. Grant, Massachusetts Institute of Technology.

Tuesday, Oct. 9—9:00 a.m.

Grand Ballroom

PROGRAM

SYMPOSIUM ON TITANIUM

Co-chairmen: B. S. Mesick and D. J. McPherson; Symposium Moderator: R. H. Thielemann

I. Panel Discussion: Sponge and Mill Production Economics—

Speaker: H. H. Kellogg, Columbia University

Panelists: W. E. Lusby, Jr., E. I. du Pont de Nemours and Co.; T. W. Lippert, Titanium Metals Corporation of America; P. Alspaugh, Electro Metallurgical Co.; V. W. Whitmer, Republic Steel Corp.; D. W. Kaufmann, Rem-Cru Titanium, Inc.; F. Vandenburgh, Mallory-Sharon Titanium Corp.

II. Panel Discussion: Fabrication Economics—

Speaker: S. A. Gordon, Battelle Memorial Institute.

Panelists: G. Fairbairn, North American Aviation, Inc.; W. H. Sharp, Pratt and Whitney Aircraft Division, United Aircraft Corp.; A. L. Rustay, Wyman-Gordon Co.; R. A. Paetz, Thompson Products, Inc.; S. R. Carpenter, Convair Division, General Dynamics Corp.

Tuesday, Oct. 9—2:00 p.m.

Grand Ballroom

SYMPOSIUM ON TITANIUM

Co-chairmen: B. S. Mesick and D. J. McPherson; Symposium Moderator: R. H. Thielemann.

III. Panel Discussion: State of Analytical Development—

Speaker: S. Vigo, Watertown Arsenal

Panelists: T. D. McKinley, E. I. du Pont de Nemours and Co.; J. E. Griffin, Mallory-Sharon Titanium Corp.; H. T. Clark, Jr., Rem-Cru Titanium, Inc.; A. F. Ernster, Ford Motor Co.; W. A. Dupraw, National Research Corp.; M. J. Miles, Titanium Metals Corporation of America.

IV. Panel Discussion: Practical Problems Associated With the Control of Interstitials—

Why TECUMSEH Compressor Crankcases Are MICROHONED

"On Tecumseh compressors, we Microhone the piston bores. ***This gives us a running seal between pistons and bores which prevents gas leakage and eliminates the need for piston rings!*** Believe me, it takes a real combination of accuracy and functional surface finish to get results like that . . . and only Microhoning has given us that combination!"

(Tecumseh Products Company, Tecumseh, Michigan, is the world's largest producer of refrigeration compressors. Precision engineered and processed these units are hermetically sealed before leaving the factory.)

OTHER JOB DATA:

MATERIAL	Cast iron
PRECEDING OPERATION	Diamond finish-bore
MICROHONING OPERATIONS	One
STOCK REMOVAL	.0007" to .001"
FINISH	10 Microinches
TOLERANCES	
Diametric	.0003"
Roundness	.00015"
Straightness (Taper)	.00015"
HONING CYCLE	18 seconds, including fixture indexing time

"Here's our twin cylinder crankcase. The two piston bores in each case are opposite one another in the vertical plane, but they lie in two different horizontal planes. We simultaneously Microhone both bores in each crankcase, using a horizontal type machine with two opposing spindles."

"Although all of our crankcases are similar in design, the bores vary in diameter—1.312", 1.375", 1.500" and 1.625". Two fixtures on a two-position rotary indexing table let us Microhone one crankcase while another is being loaded. To run different bore diameters we just change the tools and gage rings. Switchover time is about five minutes."

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☐ *Please send literature and case histories on Microhoning.*

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METAL SHOW PROGRAM

Speakers: L. S. Busch, Mallory-Sharon Titanium Corp.; H. Brown, Solar Aircraft Co.; C. Handova, North American Aviation, Inc.

Panelists: H. T. Clark, Jr., Rem-Cru Titanium, Inc.; T. Perry, Republic Steel Corp.; S. A. Herres, Titanium Metals Corp. of America; J. A. King, Thompson Products of Canada.

Tuesday, Oct. 9—2:00 p.m.

Petit Cafe

RESEARCH SUMMARIES—ATOM MOVEMENTS AND STRUCTURE

Co-chairmen: F. J. Shortsleeve and D. J. Blickwede.

Basal Plane Development in Electrodeposited Hexagonal Close-Packed Metals—Zinc, Titanium, Zirconium—W. R. Opie, National Lead Co.

Surface Activity Methods for the Determination of Diffusion Coefficients in Solids—R. H. Condit and C. E. Birchenall, James Forrestal Research Center, Princeton University.

X-Ray Diffraction Determination of the Coefficients of Expansion of Alpha Uranium—J. R. Bridge, C. M. Schwartz, and D. A. Vaughan, Battelle Memorial Institute.

Solubility of Boron in Fe_3C and Variation of Saturation Magnetization, Curie Temperature, and Lattice Parameter of Fe_3 (C,B) with Composition—M. E. Nicholson, University of Minnesota.

Crystal Structure of Delta-Prime Plutonium and the Thermal Expansion Characteristics of Delta, Delta-Prime and Epsilon Plutonium—F. H. Ellinger, Los Alamos Scientific Laboratory, University of California.

Structure of the Transition Phase, Omega, in Titanium-Chromium Alloy—A. E. Austin and J. R. Doig, Battelle Memorial Institute.

Neutron Diffraction Study of Textures in Drawn Body-Centered Cubic Metals—R. A. Swalin, University of Minnesota, and A. H. Geisler (deceased).

Relative Interfacial Energies of Symmetrical Tilt Grain Boundaries in Silver—K. T. Aust, General Electric Co.

Wednesday, Oct. 10—9:00 a.m.

Grand Ballroom

RESEARCH SUMMARIES—KINETICS AND THERMODYNAMICS

Co-chairmen: C. E. Birchenall and R. A. Swalin.

Structure Dependent Corrosion of Cu_3Au — Experiments Relating to the Mechanism of Stress Cracking of Homogeneous Solid Solutions — Robert Bakish, Sprague Electric Co., and W. D. Robertson, Yale University.

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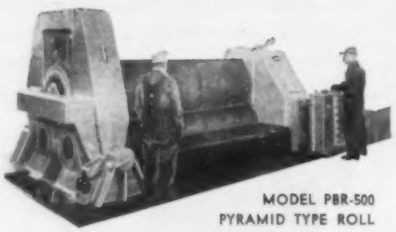

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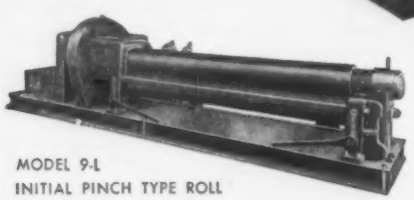

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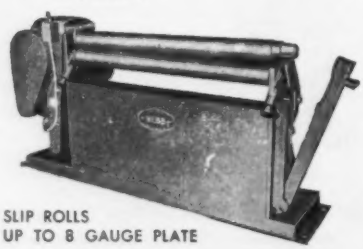

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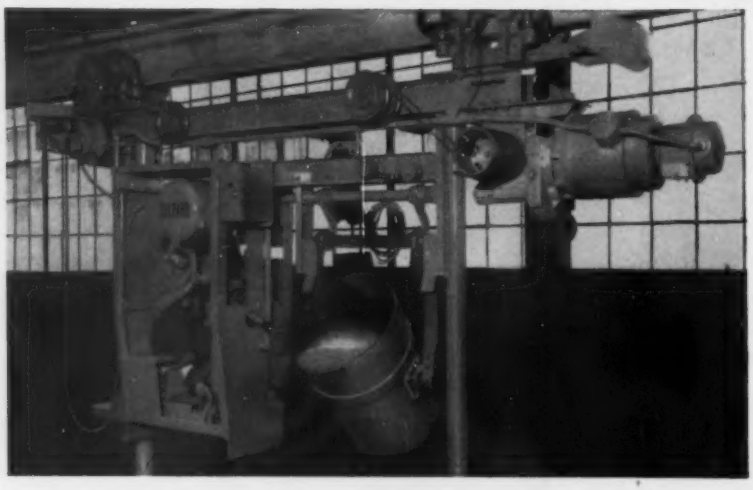

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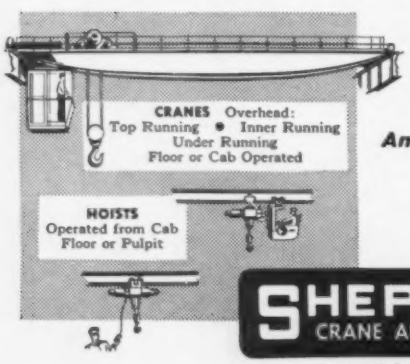

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Growth of External Copper Layers During the Internal Oxidation of Dilute Cu-Al Alloys in a Cuprous Oxide-Copper Pack—D. L. Wood, General Electric Co.

Free Energy of Formation of Mn_3C_4 From Vapor-Pressure Measurements—C. L. McCabe and R. G. Hudson, Carnegie Institute of Technology.

Oxygen in Liquid Iron-Nickel Alloys—H. A. Wriedt, U. S. Steel Corp., and John Chipman, Massachusetts Institute of Technology.

Wednesday, Oct. 10—9:00 a.m.

Petit Cafe

RESEARCH SUMMARIES—TRANSFORMATION

Co-chairmen: J. S. Smart, Jr. and R. F. Hehemann.

Study of the Iron-Silicon Order-Disorder Transformation — F. W. Glaser, Alloy Precision Castings Co., and W. Ivanick, Schwarzkopf Development Corp.

Structural Changes During the Aging in an Aluminum-Magnesium-Zinc Alloy—L. F. Mondolfo, Illinois Institute of Technology; N. A. Gjostein, Carnegie Institute of Technology; and D. W. Levinson, Armour Research Foundation.

Sympathic Nucleation of Ferrite — H. I. Aaronson and C. Wells, Carnegie Institute of Technology.

Electrical Resistivities and Phase Transformations of Lanthanum, Cerium, Praseodymium, and Neodymium — F. H. Spedding, A. H. Daane, and K. W. Herrmann, Iowa State College.

Wednesday, Oct. 10—2:00 p.m.

Grand Ballroom

SYMPOSIUM ON MAGNETISM

Co-chairmen: J. C. Fisher and Morris Fine.

Fundamentals of Magnetism—J. B. Goodenough, Lincoln Laboratory, Massachusetts Institute of Technology.

PROGRAM

Kinetics of Magnetization—D. S. Rodbell, General Electric Co.

Metallurgy of Magnetic Materials—J. J. Becker, General Electric Co.

Wednesday, Oct. 10—2:00 p.m.

Petit Cafe

RESEARCH SUMMARIES—ALLOY SYSTEMS

Co-chairmen: A. D. Schwope and William Rostoker.

Study of Ferrous Ternary Diagrams in Relation to Magnetic Interactions: The FeNiAl System—U. H. Roesler, Westinghouse Research Laboratories.

Melting Point Determination of Hafnium, Zirconium, and Titanium — D. K. Deardorff and E. T. Hayes, U. S. Bureau of Mines.

Gamma Loop Studies in the Iron-Silicon and Iron-Silicon-Titanium Systems — G. G. Bentle and W. P. Fishel, Vanderbilt University.

Uranium-Bismuth System—R. J. Teitel, Brookhaven National Laboratory.

Uranium-Silicon Alloys—A. E. Kaufmann, Nuclear Metals, Inc.; B. D. Cullity, University of Notre Dame; and G. Bitsianes, University of Minnesota.

Uranium-Zinc System — P. Chiotti, H. H. Klepfer, and K. J. Gill, Iowa State College.

Constitution of Nickel-Rich Quaternary Alloys of the Nickel-Chromium-Titanium-Aluminum System—A. Taylor, Westinghouse Research Laboratories.

Solid Solubility of Carbon in Chromium—W. H. Smith, General Electric Co.

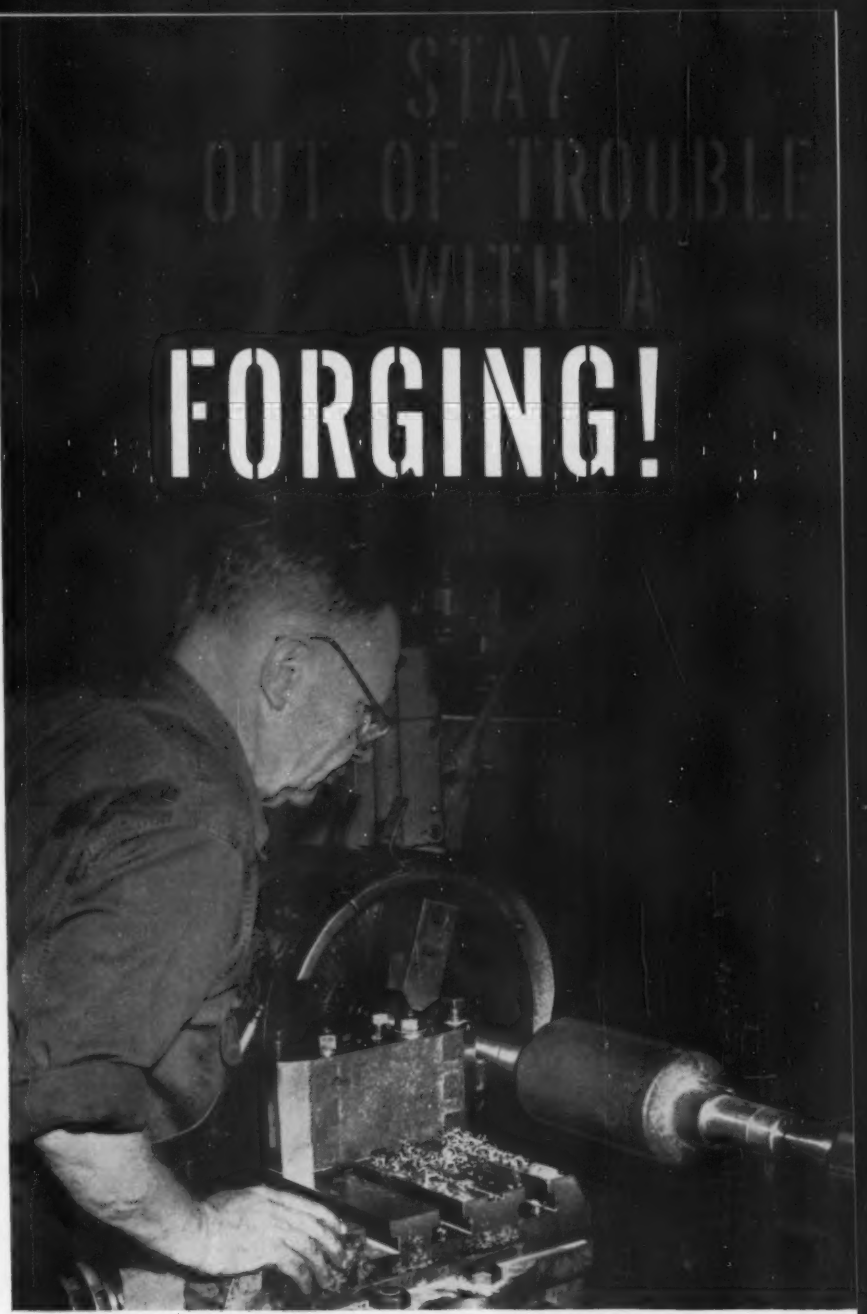
AMERICAN WELDING SOCIETY

All Sessions at Hotel Cleveland

Monday, Oct. 8—2:00 p.m.

Three Simultaneous Sessions

September 27, 1956



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METAL SHOW PROGRAM

STRUCTURES

Behavior of Welded Built-Up Beams Under Repeated Loads—J. E. Stallmeyer, W. H. Munse and B. J. Goodal, University of Illinois.

Welded Open-Web Expanded Beams—M. Altfillisch, B. R. Cooke and A. A. Toprac, University of Texas.

Welded Reinforcement of Openings in Structural Steel Tension Members—R. A. Hechtman, and D. D. Vasarhelyi, University of Washington.

WELDABILITY AND RESEARCH

Notch Toughness Characteristics of Submerged-Arc Weld Deposits—I. L. Stern, N. A. Kahn and H. Nagler, New York Naval Shipyard.

A STAMPING JOB . . . Well Done! . . . for NIKOR

This attractive all-stainless steel film developing tank made by Nikor Products Co., West Springfield, Mass., has skyrocketed into popular demand among amateur and professional photographers because of its sturdy, life-time construction and fool-proof performance.

Precision forming of these pieces—tank, cover and cap—provides an excellent example of skillful stamping by WSM—since exceptionally close tolerances are essential for water and light-tight assembly. The 5 degree bevel of cap and cover must be just right for a friction closure—in fact, each part must be a perfect fit for protection in daylight use.

Nikor recognized that WSM had the technical experience and metalworking knowledge to establish these high standards . . . and to maintain this reputation for Nikor quality.

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Effect of Metallurgical Variables on Transition Behavior in Charpy Slow-Bend and Impact Tests—C. F. Hartbower, Watertown Arsenal Laboratiories.

Mild-Steel Weld-Metal Porosity—R. D. Stout, Lehigh University and J. T. Ballass, Electric Boat Division of General Dynamics Corporation.

INERT ARC WELDING

Factors Affecting Melting Rate of Gas-Shielded Metal-Arc Welding—A. Lesnewich, Air Reduction Co., Inc.

Shielding Gases for Inert-Gas Welding—W. H. Helmbrecht and G. W. Oyler, Linde Air Products Co.

Inert-Gas Metal-Arc Welding of High Pressure Valves—F. R. Zacheus, Air Reduction Sales, Inc.

Tuesday, Oct. 9—9:30 a.m.

Three Simultaneous Sessions

AIRCRAFT

Design Requirements for Fusion Welding Titanium in Aircraft Applications—R. Meredith, North American Aviation.

Fusion Welding of Magnesium-Thorium Alloys—F. K. Lampson, Marquardt Aircraft.

Weld Planishing Improves Production of Aircraft Parts—H. L. Meredith, Airline Welding and Engineering Co.

WELDABILITY AND RESEARCH

Brittle Fracture Initiation Tests—C. Mylonas and D. C. Drucker, Brown University.

Brittle Fracture Propagation in Wide Steel Plates—W. J. Hall, R. J. Mosborg and V. J. McDonald, University of Illinois.

The Effect of Microstructure on Notch Toughness—Part IV—J. C. Danko, R. D. Stout and J. H. Gross, Lehigh University.

DESIGN AND INSPECTION

How Welding Can Further Bridge Building Progress—O. Blodgett, The Lincoln Electric Co.

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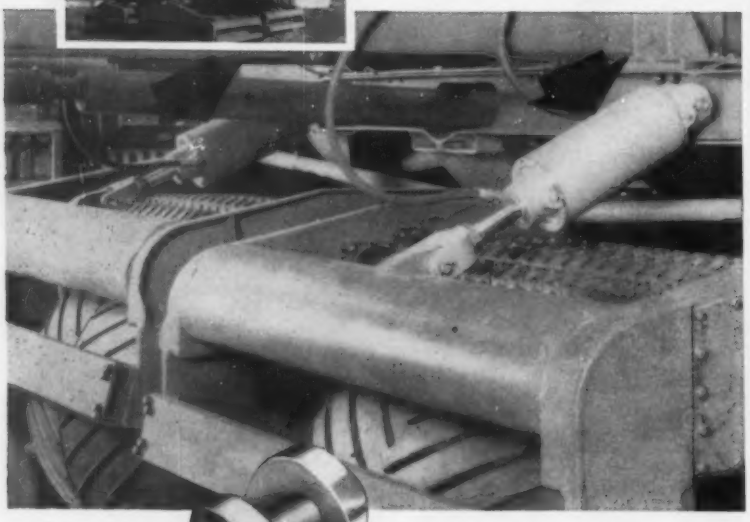

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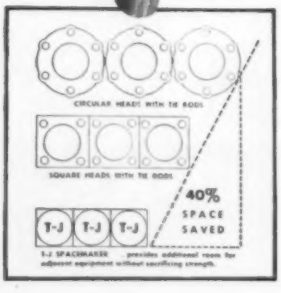

T-J TOMKINS-JOHNSON
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Industrial Radiography by Gamma Ray Projection From Radioactive Isotopes—C. M. Dick, Metal & Thermit Corp.

Greater Acceptance of Welding Through the Use of Inspection Methods—J. R. Harren, Magnaflux Corp.

Tuesday, Oct. 9—2:00 p.m.

Three Simultaneous Sessions

INERT-ARC WELDING

Selection of Proper Inert-Gas-Shielded Arc-Welding Process — C. J. Sullivan and I. D. Holster, Jr., Air Reduction Sales Co.

Consumable - Electrode Inert - Gas Welding With Small - Diameter Wires—K. E. Richter and J. F. M. Essig, Linde Air Products Co.

Inert-Gas-Shielded Metal-Arc Spot Process—J. W. Kehoe and H. J. Bichsel, Westinghouse Electric Corp.

TITANIUM

An Investigation of the Weldability of Ti—6 Pct Al—4 Pct V—D. M. Daley, Jr. and C. E. Hartbower, Watertown Arsenal Laboratories.

Problems Involved in Spot Welding Titanium to Other Metals—F. W. McBee, Jr. and J. H. Henson, Defense Research Laboratory and L. R. Benson, University of Texas.

Effects of Interstitial Elements on Welds in Alpha-Beta Titanium Alloys—W. J. Lewis, M. L. Kohn, G. E. Faulkner and P. J. Rieppel, Battelle Memorial Institute.

SYMPOSIUM ON METALLIZING

Panel Discussion sponsored by AWS Committee on Metallizing.

Surfacing and Build-up—R. J. McWaters, Metallizing Engineering Co., Inc.

Ceramic Coatings, by representative Norton Co.

Corrosion—E. T. Englehart, Aluminum Research Labs.

Combination Coatings—C. J. Breitenstein, Metal-Cladding, Inc.

PROGRAM

Wednesday, Oct. 10—9:30 a.m.

Three Simultaneous Sessions

BRAZING AND SURFACING

Silver Brazing Lap Joints in Stainless Steel Tubing—G. H. Bohn, Linde Air Products Co.

Basic Characteristics of Some Heat-Resistant Brazing Filler Materials—W. Chang, General Electric Co.

Longer Service Life Through Hard Facing for Petroleum Industry Equipment—H. S. Gonser, Wall Colmonoy Corp.

FILLER METAL

A New Nodular Cast-Iron Welding Rod for Foundries and Fabricators—R. O. Day, J. S. Snyder and H. V. Inskeep, Linde Air Products Co.

Coating Ingredients Influence on Surface Tension, Arc Stability and Bead Shape—T. H. Hazlett and Earl R. Parker, University of California.

Electrode Control in an Alloy Pressure Vessel Plant—H. H. Weber, The Colonial Iron Works Co.

PIPING AND PIPELINES

Status of Efforts to Develop Mechanized Pipeline Welding Methods—P. S. Reed, The Oil and Gas Journal.

Automatic Welding of Piping—H. Thielsch and E. R. Jerome, Jr., Grinnell Co., Inc.

Automatic Welding Applications at the Whiting Refinery—R. C. Wheeler and R. M. Kolb, Standard Oil Co.

Wednesday, Oct. 10—2:00 p.m.

Three Simultaneous Sessions

RESISTANCE WELDING

Recent Developments in Magnetic Force Welding—M. J. Funk, Precision Welder & Flexopress Corp.

Regulated and Programmed Resistance Welding Control Systems—C. Sinclaire, General Electric Co.

Finish Mash Seam Welding—M. L. Begeman and W. J. Allen, University of Texas.

AGF Heat Treating Installation Cuts Costs

Solid line shows an inline installation; dotted line shows a reversing loop

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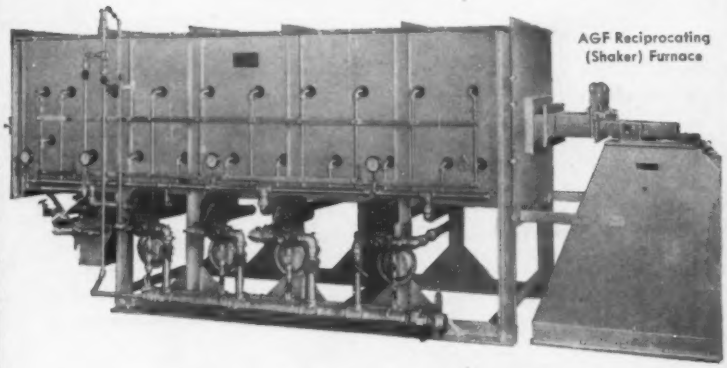

AGF Reciprocating (Shaker) Furnace

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METAL SHOW PROGRAM

STAINLESS STEEL

Properties of Austenitic Chromium-Manganese Stainless-Steel Weld Metal—H. T. DeLong and H. F. Reid, The McKay Co.

The Plastic Ductility of Welded Joints in Austenitic-Steel Piping at 1200°—R. W. Emerson and R. W. Jackson, Pittsburgh Piping and Equipment Co.

Further Studies on Stainless-Steel Hot Cracking — H. Rischall and P. P. Puzak, Naval Research Laboratory.

PRESSURE VESSELS

Fabrication of Inert-Gas Welded Aluminum Tanks and Pressure Vessels —R. J. Franz and A. R. Meyer, Graver Tank and Manufacturing Company, Inc.

The Properties of Pressure-Vessel Steels in Heavy Sections — J. H. Gross and R. D. Stout, Lehigh University.

Investigation of a Pressure Vessel Failure — J. Heuschkel, Westinghouse Research Laboratories.

Thursday, Oct. 11—9:30 a.m.

Three Simultaneous Sessions

WELDING AND CUTTING

Aspects of Crack Sensitivity in Machinable Cast-Iron Deposits on Cast Iron—J. Broderick, Practical Welding Research Laboratory and R. D. Wasserman, and J. F. Quaas, Eutectic Welding Alloys Corp.

Fundamental Concepts of Oxygen Cutting—R. L. Stoecker and H. B. Moen, Air Reduction Co., Inc.

Transverse Cracking Resulting From Oxygen Cutting — N. N. Breyer, Continental Foundry & Machine Division of Blaw-Knox Co.

ALUMINUM

Chlorine Additions in Inert Gas Metal-Arc Welding of Aluminum—A. R. Pfluger, Kaiser Aluminum and Chemical Corp., and L. A. Cook, Ravenna Metal Products, Inc.

The Thermal Stability of Cold Butt Welds in Aluminum and Copper—W. H. Bruckner and J. H. Sayles, University of Illinois.

Fabricating Aluminum With Other Metals—K. V. Lutz, All-State Welding Alloys Co., Inc.

PIPING AND TUBING

Study of Interrupted Welding of Heavy-Wall Steam Pipe — I. A. Rohrig and J. O. Smith, The Detroit Edison Co.

Welding Heavy-Wall Carbon-Steel Pipe With CO_2 Shielding Gas—A. B. Dunning, General Electric Co.

The Effects of Zinc Phosphate Coating on Flash Welding of Steel Tubing—J. F. Young and A. Phillips, Douglas Aircraft Co., Inc.

Friday, Oct. 12—9:30 a.m.

Three Simultaneous Sessions

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At Kutztown Foundry you'll find complete manufacturing facilities to build special machinery and equipment for the steel, power, chemical, food and oil industries.

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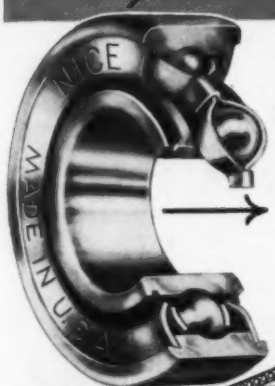

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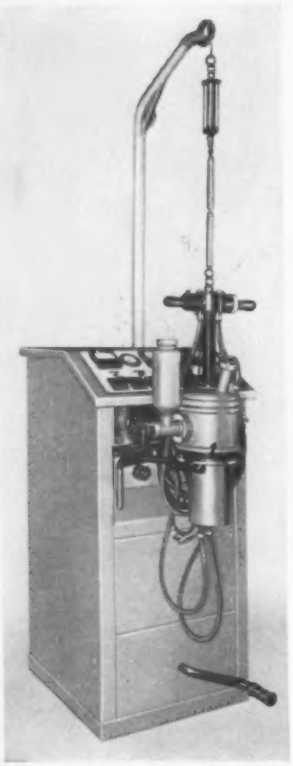


The Heraeus Vacuum Arc Melting Furnace Model VA-L200B, smallest of a line of Heraeus Furnaces sold by CEC.

With this new Heraeus Arc Melting Vacuum Furnace, the VA-L200B, you can get vacuum melts in "buttons" or ingots.

You can get them of Titanium, Zirconium, Tungsten, and other metals or alloys with high melting temperatures. You can get them fast and pure.

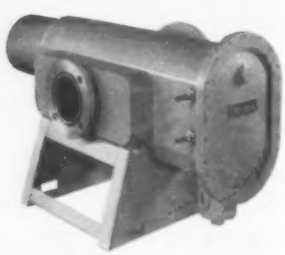
Super-fast mechanical pump—A Roots mechanical vacuum pump pulls pressures in the furnace down to 5×10^{-2}mm Hg—*fast*.

Its throughput of 10,400 micron CFM at 10 microns easily handles sudden gas bursts encountered with certain metals.

No oil contamination—The Roots pump's frictionless rotary pistons require no oil sealing. There can be no contamination from backstreaming vapors in the system.

No crucible contamination—The Heraeus furnace has a water-cooled, copper crucible which cannot contaminate the melt.

Fixed or consumable electrodes—You may use either fixed electrodes of tungsten or metallic carbides, or consumable electrodes of the metal you are melting.



This Roots pump maintains low, vapor-free pressures. A motor operating within the vacuum drives its rotary frictionless pistons.

This Heraeus furnace has many other features valuable in laboratory or small-scale production, including exceptional economy—operating either under vacuum or with an inert gas atmosphere.

Heraeus of Hanau, Germany, has licensed CEC as exclusive agent for Heraeus Arc Furnaces (and Roots Pumps) in this country. Complete details in our Bulletins P8-20 and P4-28.

See the Heraeus Furnace and the Roots Pump at the Cleveland Metal Show

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MOLYBDENUM AND ZIRCONIUM

Ductility of Tungsten Arc Welds in Molybdenum—R. N. Monroe, N. E. Weare and D. C. Martin, Battelle Memorial Institute.

The Influence of Nitrogen on the Ductility of Molybdenum Welds—W. N. Platte, Westinghouse Electric Corp.

Notch Slow Bend Testing of Zirconium and Zircaloy-2—R. G. Wheeler, General Electric Co.

PROCESSES

The Motor Arc Welding Process — C. C. Stone and R. A. Noland, Argonne National Laboratory.

High-Frequency Continuous Seam Welding of Ferrous and Nonferrous Tubing—H. B. Osborn, Jr., Tocco Div., The Ohio Crankshaft Co.

Developed Procedures for the Flexible Electrode Submerged Arc Welding Process—M. H. Fritsche, Westinghouse Electric Corp.

SHOP MANAGEMENT

Organization of Shop Management for Quality Welding—W. B. Bunn, The M. W. Kellogg Co.

Maintaining Workmanship Standards for Quality Welding—Howard Cary, Marion Power Shovel Co.

SOCIETY FOR NONDESTUCTIVE TESTING

All sessions at Hollenden Hotel

General Program Chairman: R. F. Holste, Vice-President, Society for Nondestructive Testing.

Monday, Oct. 8—9:00 a.m.

EDUCATIONAL SESSIONS

Co-chairmen: D. T. O'Connor, Machlett Laboratories, Inc., Springdale, Conn.; Frank Catlin, Magnaflux Corp., Chicago.

Welcome—Hamilton Migel, President, S.N.T.

Orientation—D. T. O'Connor, Chairman, S.N.T. Educational Committee.

PROGRAM

Sources of Defects Located by Nondestructive Testing — C. E. Betz, Magnaflux Corp., Chicago.

Radiography—W. D. Kiehle, Eastman Kodak Co., Rochester, N. Y.

Radiographic Film Interpretation—L. L. Johnson, Pratt & Whitney Aircraft, East Hartford, Conn.

Fluoroscopy—W. R. Hampe, Westinghouse Electric Corp., Baltimore.

Penetrant Testing—Taber DeForest, Magnaflux Corp., Chicago.

Eddy Current Testing—G. O. McClurg, Magnaflux Corp., Chicago.

Monday, Oct. 8—1:45 p.m.

EDUCATIONAL SESSIONS

Magnetic Particle Inspection—W. E. Thomas, Magnaflux Corp., Chicago.

Ultrasonic Testing, Contact Methods—by Ralph W. Frank, Sperry Products, Inc., Danbury, Conn.

Ultrasonic Testing, Immersed Methods—J. B. Morgan, Aluminum Co. of America, New Kensington, Pa.

Ultrasonic Testing, Resonance Methods—P. K. Block, Branson Instrument Co., Stamford, Conn.

Question Period

Tuesday, Oct. 9—9:00 a.m.

DEVELOPMENTS IN NONDESTRUCTIVE TESTING METHODS — SESSION I

Co-chairmen: M. Grosman, Sylvania Electric Products, Inc., Bayside, N. Y.; R. B. MacCauley, Ohio State University, Columbus, O.

Standardization and Applications of Ultrasonic Surface Wave Inspection—G. J. Binczewski, Kaiser Aluminum & Chemical Corp., Spokane.

Data Extraction in Nondestructive Testing—H. N. Staats, Applied Research, Inc., Chicago.

Inspection of Small Diameter Tubing by Eddy Current Methods—J. W. Allen and R. B. Oliver, Metallurgy Division, Oak Ridge National Laboratory, Oak Ridge, Tenn.

Broad Beam Attenuation Data for Concrete for 70-250 K.V.P. X-Rays

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PROGRAM

—E. D. Trout, General Electric Co., X-Ray Dept., Milwaukee.

Design and Application of a Portable X-Ray Spectograph—I. I. Bessen, North American Philips Co., Inc., Mount Vernon, N. Y.

Tuesday, Oct. 9—1:30 p.m.

NONDESTRUCTIVE TESTING IN THE PETROLEUM AND CHEMICAL INDUSTRIES

Co-chairmen: A. Barkow, Natural Gas Pipeline Co. of America, Chicago; F. Hohn, Scullin Steel Co., St. Louis.

Quality Characteristics of Chemical Equipment and Their Control Through Nondestructive Testing—C. J. Veith, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Inspection of Piping—H. Thielsch, Grinnell Company, Inc., Providence.

Ultrasonic Inspection in the Oil Refining and Related Industries—D. J. Evans, Engineering Test Services, Inc., Tulsa, Okla.

A Fast, Economical Inspection for Drill Pipe—F. M. Wood, Tuboscope Co., Houston.

Tuesday, Oct. 9—6:30 p.m.

Hospitality Hour, Banquet, and Presentation of S.N.T. Awards.

Wednesday, Oct. 10—9:00 a.m.

NONDESTRUCTIVE TESTING OF NUCLEAR REACTOR COMPONENTS

Co-chairmen: W. McGonnagle, Argonne National Laboratory, Lemont, Ill.; D. C. Worlton, General Electric Co., Hanford Atomic Products Operation, Richland, Wash.

Nondestructive Testing Problems in the Nuclear Reactor Field—S. McLain and W. J. McGonnagle, Argonne National Laboratory, Lemont, Ill.

Basic Principles and Techniques of Eddy Current Testing—H. L. Libby, General Electric Co., Hanford Atomic Products Operations, Richland, Wash.

Ultrasonic Methods and Techniques Used at the Savannah River Laboratory—R. W. Leep and J. D.

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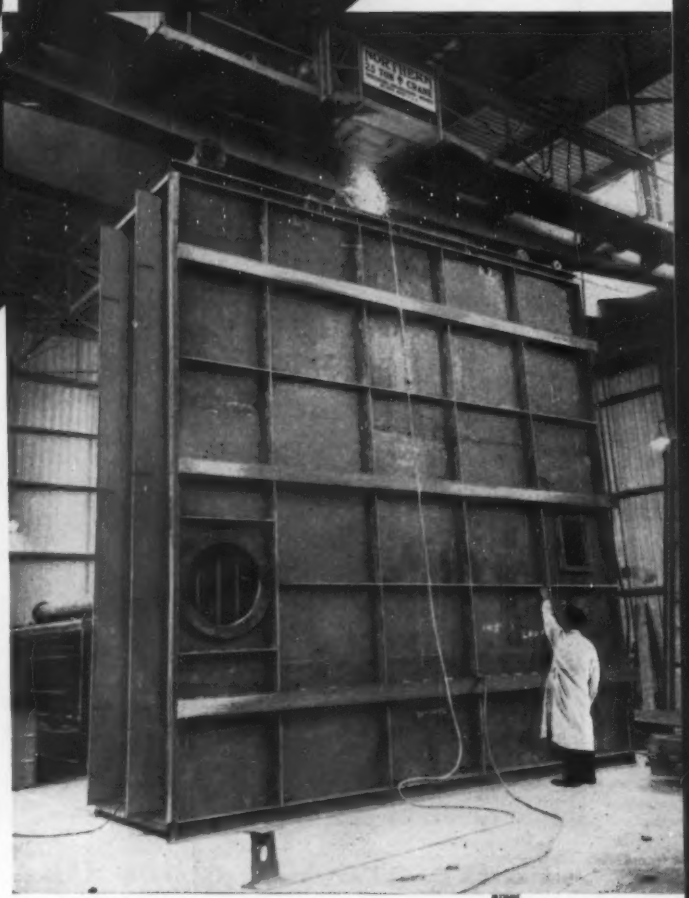

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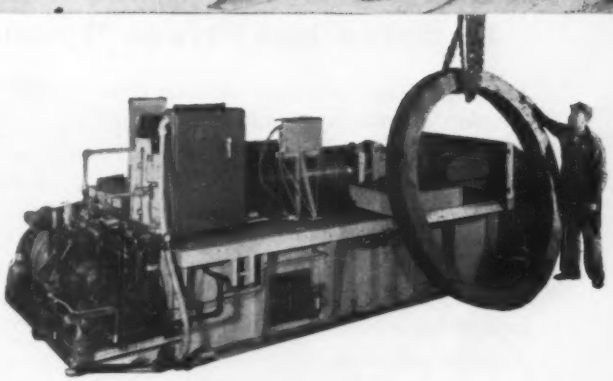
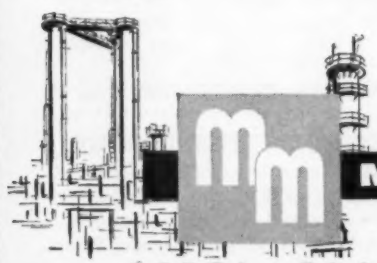
Something different in fabrication service is illustrated. It's our new six hundred ton horizontal press for cold-forming heavy bars, channels, conveyor rails and other structural steel members. The 67″ I.D. gear blanks shown are SAE 6150 steel, of 6″ x 6″ cross section, formed and then welded into an accurate ring. After welding, joints are cobalt-bomb x-rayed. Such equipment permits us to offer you close tolerance forming to almost any configuration with no heating or reheating (depending on nature of material), simplified dies, faster service and lower costs.

Please send prints or specifications for prompt quotation on your next fabrication job, or write for brochure illustrating our facilities and production.



New 600-ton "Bulldozer" — M-M designed and built horizontal forming press.



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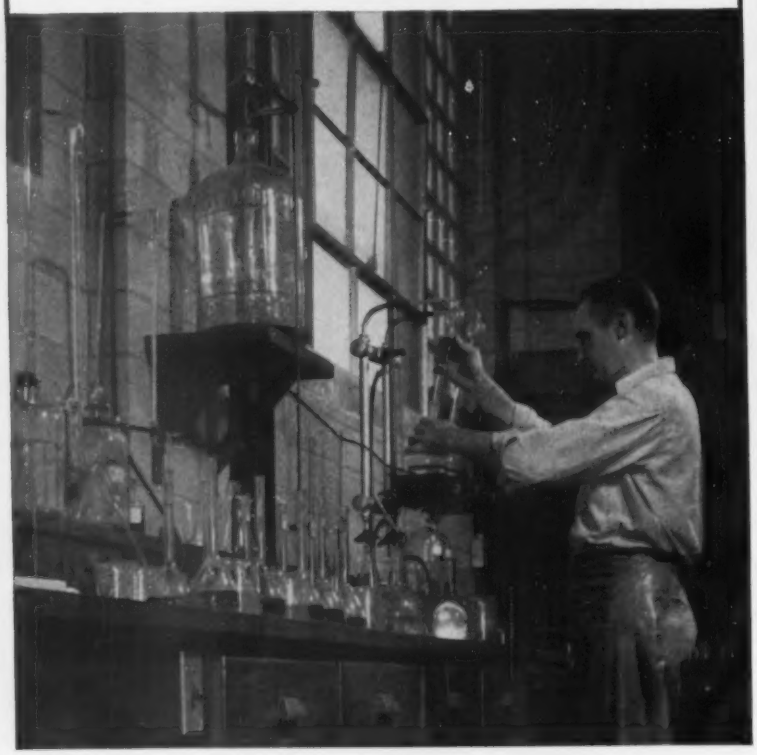

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Elyria, Ohio

Ross, Savannah River Laboratory, E. I. du Pont de Nemours & Co., Aiken, S. C.

Inspection of Small Diameter Tubing for Nuclear Reactor Applications—R. B. Oliver, Oak Ridge National Laboratory, Oak Ridge, Tenn.

Ultrasonic Scanning and Recording Equipment—W. N. Beck. Argonne National Laboratory, Lemont, Ill.

Wednesday, Oct. 10—1:30 p.m.

MEHL HONOR LECTURE

Standards for Nondestructive Testing Practices—N. L. Mochel, Westinghouse Electric Corp., Philadelphia.

ANNUAL MEETING

Thursday, Oct. 11—9:00 a.m.

DEVELOPMENTS IN NONDESTRUCTIVE TESTING METHODS — SESSION II

Co-chairmen: B. Havercroft, Phys. Met. Division, Mines Branch, Ottawa, Ont., Canada; B. Cantor, Washington, D. C.

The Ultrasonic Micrometer—A New Nondestructive Test Tool—H. A. Rocha, Large Stream Turbine-Generator Dept., General Electric Co., Schenectady.

Production Inspection of Pipe and Tubing by the Immersed Ultrasound Method—R. B. Oliver, R. W. McClung and J. K. White, Oak Ridge National Laboratory, Oak Ridge, Tenn.

Field Performance of TVX System—J. E. Jacobs and A. L. Pace, General Electric Co., X-Ray Dept., Milwaukee.

Fluoroscopy With Electronic Image Intensification—A. L. Gobus, Instruments Division, North American Philips Co., Inc., Mount Vernon, N. Y.

Thursday, Oct. 11—1:30 p.m.

NONDESTRUCTIVE TESTING OF AIRCRAFT

Co-chairmen: R. H. Sparling, Convair Div., General Dynamics Corp., Pomona, Calif:; L. L. Johnson, Pratt

PROGRAM

& Whitney Aircraft, East Hartford, Conn.

Relationship Between Defect Orientation and Ultrasonic Indications—R. E. Kleint, North American Aviation, Inc., Los Angeles, Calif.

Classification of Contractor's Standards for the Procurement of Bureau of Aeronautics Magnesium and Aluminum Castings — E. L. Criscuolo and N. Modine, U. S. Naval Ordnance Laboratory, White Oak, Silver Springs, Md.

Radiography in Production Control and Inspection of Reliable Subminiature Tubes—E. A. Kolm, Raytheon Manufacturing Co., Newton, Mass.

X-Ray of Airframe Components at the Aircraft for Maintenance Purposes—F. R. Richardson, U. S. Air Force, Oklahoma City, Okla.

INDUSTRIAL HEATING EQUIPMENT ASSOCIATION

In cooperation with the American Society for Metals.

Session at Statler Hotel

Tuesday, Oct. 9, 1956— 9:30 a.m.

FURNACE ATMOSPHERES — THEIR SELECTION AND APPLICATION

Review of Atmospheres—Their Types —C. H. Vaughan, Electric Furnace Co.

Review of Atmospheres — Their Applications — C. E. Peck, Westinghouse Electric Corp.

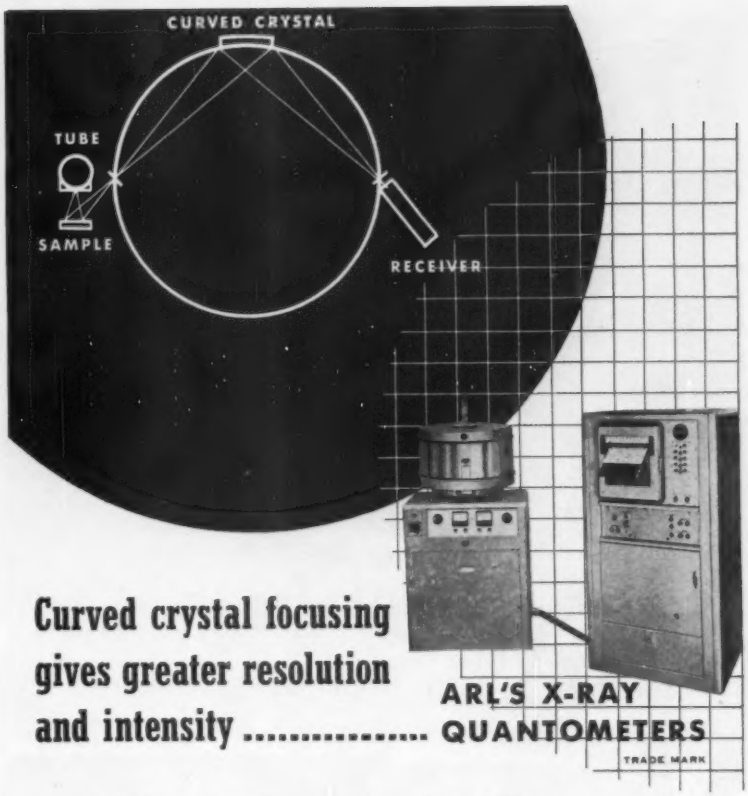
FURNACE ATMOSPHERES — THEIR CONTROL

Types of Controllers Available — Wayne Besselman, Leeds & Northrup Co.

Methods of Controlling Atmosphere Converters—Walter Holcroft, Holcroft & Co.

Methods of Controlling Atmosphere in Furnaces—Orville Cullen, Surface Combustion Corp.

Atmosphere Furnaces — Their Safe Operation — N. H. Davies, North American Mfg. Co.



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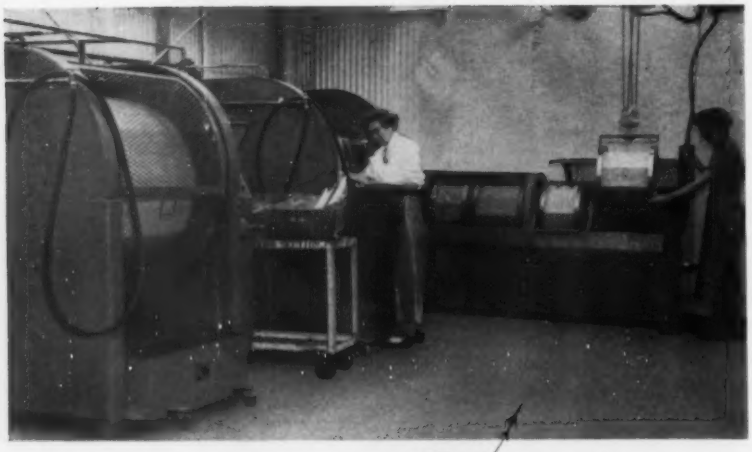

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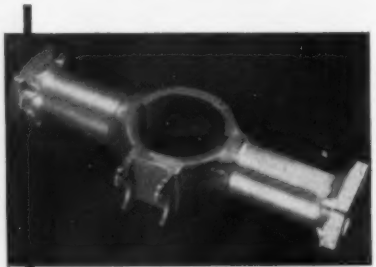
- *Handling and Separating Equip.*

**As told in Iron Age Magazine — August 2, 1956*



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PROGRAM

METALS DIV.—SPECIAL LIBRARIES ASSOCIATION

All sessions at Public Auditorium, Club Room C. Headquarters: Hotel Manger.

Wednesday, Oct. 10—10:30 a.m.

Cuyahoga River Valley Industrial Cruise.

Wednesday, Oct. 10—2:00 p.m.

Field trip to National Carbon Co. Research Laboratories and Library.

Wednesday Oct. 10—7:00 p.m.

Field trip to Ford Motor Co. Cleveland Foundry and Engine Plant No. 2 Automated Assembly Lines.

Thursday, Oct. 11—10:00 a.m.

Automation in Literature Research (A report on the ASM Mechanized Literature Searching Project) — Allen Kent, Western Reserve University.

Thursday, Oct. 11—2:00 p.m.

Publications on Industrial Uses of Atomic Energy. (Best sources of information and organization and use of the library.)

The Literature of Industrial Power Uses of Atomic Energy—F. E. Croxton and Philip Leslie, Goodyear Atomic Corp.

The Literature of Radiation Effects on Materials—J. B. Dodd, Babcock & Wilcox Co.

The Literature of Radioactive Testing Techniques — Speaker to be announced.

Thursday, Oct. 11—6:30 p.m.

Dinner and social hour, Hotel Manger, Dr. Lillian Gilbreth, guest speaker.

Friday, Oct. 12—11:00 a.m.

Tour of Port of Cleveland, U. S. Customs facilities.

Friday, Oct. 12—4:30 p.m.

Optional visits to technical libraries.

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Alphabetical List of Exhibitors

A

	Booth
Aaron Machinery Co., Inc.	2224
Abaco Industries, Inc.	2434
Acetogen Gas Co.	2656
Acme Steel Co.	1933
Acme Tool Co.	715
Adamas Carbide Corp.	1747
Advance Glove Mfg. Co.	2803
Aeronautical Service Eng.	2751
Aeroprojects Inc.	2333
Ajax Electric Co.	1609
Ajax Electrothermic Corp.	1609
Ajax Engineering Corp.	1609
Aldridge Industrial Oils, Inc.	525
Al-Fin Division	2324
Allegheny Ludlum Steel Corp.	451
Allis-Chalmers Mfg. Co., Buda Div.	2509
Allison Div.	1816
Alloy Engineering & Casting Co.	936
American Brake Shoe Co.	215
American Cast Iron Pipe Co.	2144
American Chain & Cable Co., Inc.	1816
American Chemical Paint Co.	2332
American Cyanamid Co.	1501
American Cystoscope Makers, Inc., Borescope Div.	2836
American Gas Association	2859
American Gas & Elec. Service Corp.	2007
American Gas Furnace Co.	2841
American Herforder Corp.	2033
American Machine & Metals, Inc.	241
American Optical Co.	1136
American Positive Grip Vise Corp.	2773
American Pullmax Co. Inc.	2521
American Silver Co., Ind. Metals Div.	930
Amer. Wheelabrator & Equip. Corp.	2580
Amperex Electronic Corp.	2635
Apex Tool & Cutter Co. Inc.	2816
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Arcweld Mfg. Co.	2302
Aro Spotwelder Div.	2733
Ashworth Bros., Inc.	2660
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Baird Associates—Atomic Inst. Co.	1234
Balcrank, Inc., Ind. Pump & Eq. Div.	521
Baldwin-Lima-Hamilton Corp.	2104
Balteau Electric Corp.	2622
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Barber-Colman Co.	1829
Barer Eng. & Mach. Co. Ltd.	2316
Battelle Memorial Institute	542
Bausch & Lomb Optical Co.	422
Morris Bean & Co.	920
Bede Products Corp.	1101
Bendix Aviation Corp.	2123
Beryllium Corp.	1834
Binks Manufacturing Co.	2755
Black Drill Co. Inc.	914
Blackstone Corp.	2552
Blakeslee & Co., G. S.	1019
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Branson Ultrasonic Corp.	2145
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Brown Instruments Division	312

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Brush Electronics Co.	1726
Buck Mfg. Co.	2546
Buck Tool Co.	1528
Buda Division	2509
Budd Co., Gamma Division	1707
Buehler Ltd.	260

C

Cadmet Corp.	2667
Cam-Lok Div., Empire Prod., Inc.	2520
Cammann Manufacturing Co.	1737
Campbell Machine Div.	1816
Carbide and Carbon Chemicals Co.	1608
Carlingo Commodities Corp.	2107
Carter Contfols, Inc.	803
Center for Documentation & Communication Research	270
Central Foundry Div., G. M. Corp.	2134
Chicago Rivet & Machine Co.	2529
Chilton Co.	1402
Cincinnati Sub Zero Products	2573
Circo Equipment Co.	2101
Cities Service Petroleum, Inc.	1229
Clementina Ltd.	2673
Cleveland Designers & Consultants, Inc.	2873
Cleveland Electric Illuminating Co.	911
Cleveland Grinding Machine Co.	337
Cleveland Metal Abrasive Co.	1908
Cleveland Tool & Die Co.	337
Clevite Corp.	1728
Climax Molybdenum Co.	360
Coated Coil Corp.	2628
Cobalt Infor. Ctr., Battelle Mem. Inst.	542
Cold Metal Products Co.	1120
Collins Microflat Co., Inc.	939
Commander Manufacturing Co.	736
Consol. Electrodynamics Corp.	1929
Continental Drill Corp.	532
Continental Industrial Engineers, Inc.	2831
Cooper Metallurgical Associates	1033
Copperweld Steel Co., Steel Div.	311
Crane Packing Co.	2617
Curtiss-Wright Corp.	2032

D

Dake Corp.	2554
Delta Power Tool Div.	1916
A. P. de Sanno & Son, Inc.	1942
Detrex Chemical Industries, Inc.	1907
Detroit Testing Machine Co.	1806
DeWalt Inc.	2670
Dilley Manufacturing Co.	810
Di-Met Corp.	2854
Henry Disston Div., H. K. Porter Co.	2731
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DuBois Co., Inc., The	2423
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Dynamic Gear Co., Inc.	2871

E

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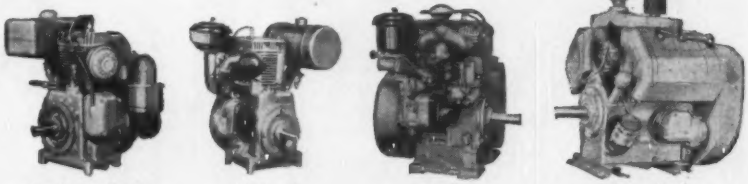
Eastman Kodak Co.	1002
East Shore Machine Products Co.	2560
Eclipse Fuel Engineering Co.	1724
Eclipse-Pioneer Div., Bendix Av. Corp.	2123
Electric Furnace Co.	1041
Electro-Alloys Division	215
Electro Arc Sales Co.	1204
Electro Metallurgical Co.	1608
Elox Corp. of Michigan	2131

POWER to Match Your Equipment



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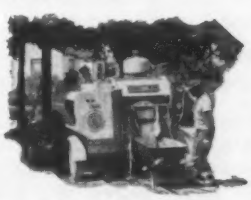

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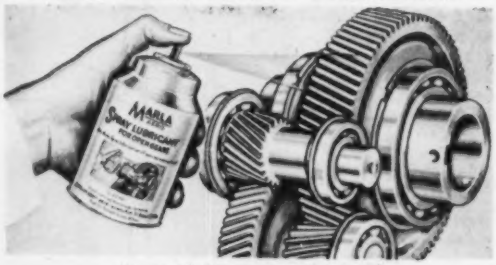

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Empire Products, Inc.	2520
Enamelstrip Corp.	2628
Engelberg Huller Co., Inc.	2746
Engineered Castings Division	215
Ercona Corp.	937
Eriez Manufacturing Co.	2716
Exomet, Inc.	2571
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Fabristeel Products Inc.	1421
Fairchild Engine & Airplane Corp.	2324
Falcon Tool Co.	2667
Farrel-Birmingham Co., Inc.	2777
Fawick Airflex Div.	1934
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Fenn Manufacturing Co.	331
Fenway Machine Co., Inc.	1204
Ferrotherm Co.	536
Flick Reedy Corp.	1623
Forest City Foundries Co.	2856
Fulton Foundry & Machine Co.	2753
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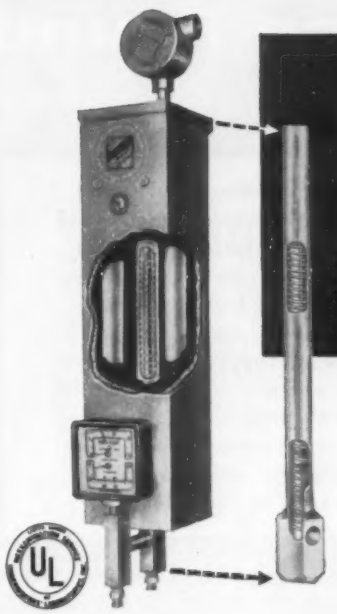
Gas Machinery Co.	2833
Gasway Corp.	2864
General Alloys Co.	351
General Electric Co., Appar. Sales Div.	305
General Electric Co.	2124
General Electric Co., X-Ray Dept.	1104
General Motors Corp.	2134
General Riveters, Inc.	2616
General Ultrasonics Co.	2866
B. F. Goodrich Co., Av. Prod. Div.	2535
Graham Machine Tool Co.	2403
Graham Transmissions Inc.	804
Gray Co. Inc.	2618
Gregory Industries, Inc.	1930
Grayco Products	2618
Gries Industries, Inc.	550
Gries Reproducer Corp.	550
Gulf Oil Corp.	1527
Guthery Machine Tool Corp.	2733
H	
H & H Research Co.	715
HPL Manufacturing Co.	1240
William J. Hacker & Co., Inc.	1709
Hamler Industries, Inc.	907
Hammond Machinery Builders, Inc.	1250
F. Ward Harman Associates	2718
Harper Electric Furnace Corp.	724
Harris Calorific Co.	223
Harsco Corp.	1038
Harshaw Scientific Div.	2647
Haynes Stellite Co.	1608
Heatbath Corp.	1506
Heil Process Equipment Corp.	2766
Heli-Coil Corp.	2415
Hevi Duty Electric Co.	209
High Vacuum Equipment Corp.	2702
High Voltage Engineering Corp.	720
Hobart Brothers Co.	2541
Holcroft & Co.	346
Holden Co., A. F.	1415
Holger Andreasen, Inc.	537
Holliday Co., R. L.	704
Hones Inc., Charles A.	2857
Houghton & Co., E. F.	1145
Howard Foundry Co.	212
Huck Manufacturing Co.	2805
I	
Illinois Testing Laboratories, Inc.	1214
Industrial and Scientific Products Div.	2032

What's New in paint heaters



Binks new DUALHEET paint heater has removable paint tract

Only Binks DUALHEET paint heaters incorporate the following features... features which insure easy maintenance and long, dependable operating life.

Lower maintenance costs
The paint tract is a heated chamber within the unit where the temperature of the paint is raised to 160°-180°F. It has no parts that are affected by the intense heat...a common cause of many paint heater failures. Easy removal of the paint tract for periodic inspection and cleaning saves both time and money. Should major servicing ever be required, a new, low-cost paint tract can be installed in less than 5 minutes.

Lower operating costs
Heating finishes with a Binks DUALHEET paint heater reduces need for thinners. With higher solids content, one pass of the spray gun applies greater film thickness with less overspray and provides greater coverage per gallon. Less atomizing air pressure is needed. Fewer rejects ...sags and runs are virtually eliminated.

Simple installation
A Binks DUALHEET paint heater fits easily into existing cold spray process systems either as a portable or stationary unit. Electrically heated, it requires no special auxiliary heating attachment or space. Available in two production-rated capacities—15 or 8 gallons per hour. May be used with pressure tanks, material handling pumps or paint circulating systems.

Simple operation
Operators will experience no difficulty in shifting from cold to hot spray process.

For complete information ask your local industrial distributor for Binks DUALHEET Bulletin or write direct to the address below.

Ask about our spray painting school
Open to all...NO TUITION...covers all phases

681

Binks
EVERYTHING FOR SPRAY PAINTING

GUNS

SPRAY BOOTHS

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BOOTH 2755

Binks Manufacturing Company
3124-30 Carroll Ave., West, Chicago 12, Ill.

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Service Foundry is prepared to meet your most exacting requirements—and can promise you speedy service. The most modern foundry equipment, plus skilled engineers, pattern makers, foundry men and machinists make it possible to perform *every* job with skill, care and precision. Service can provide clean, sound pattern-true castings in iron, steel and non-ferrous materials—gear cutting and machine work. Next time, call for "SERVICE" . . .

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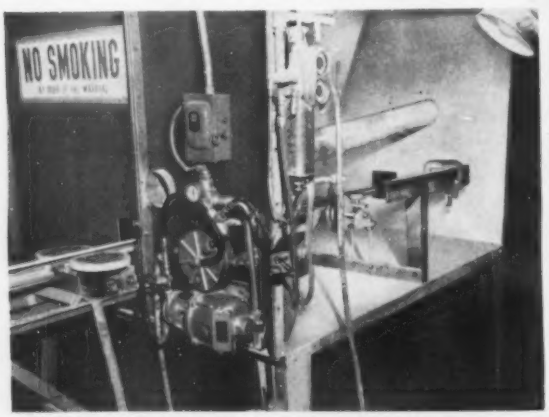

KELLEY SLASHES FINISHING COSTS . . . INCREASES PRODUCTION 400%

Hot spray finishing has eliminated one complete coat and one handling of 10-ft. galvanized "Z" forms at Kelley Mfg. Co., Houston. Production has jumped 400%, and finishing costs are down 46%.

Kelley's finishing operation is automatic. Two guns controlled by an electric eye spray the forms with white lacquer. Two coats of cold spray were formerly used, producing insufficient build and poor coverage.

Now, a *single* coat hot sprayed gives better build, uniform coverage and higher gloss. Rejects are virtually eliminated. There was no change in material.

Hot spray can make a big difference in YOUR finishing operation. For a free booklet, "Why Hot Spray?", write the Spee-Flo Company, Dept. IA 21, 720 Polk, Houston, Texas.

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PERFORATED METALS

The few perforations illustrated are indicative of the wide variety of our line—we can *perforate almost any size perforation in any kind of metal or material required.* Send us your specifications.

Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

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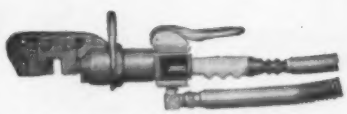
WIRE AND ROD CUTTERS

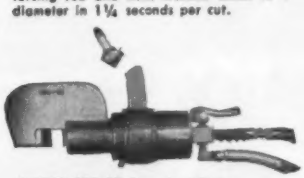
Big Capacity

FAST • EASY TO USE



MODEL MC 210 Capacity ½" High speed . . . ½ second per cut for steel rod to ½". Full swivel action.

MODEL MC 35 Capacity 1" Cuts high carbon material including reinforcing rod and heat treated chain to 1" diameter in 1¼ seconds per cut.



MODEL MC 65 Capacity 1¼" Cuts 1¼" diameter steel in 2 seconds per cut. Can be modified to cut 1⅝" diameter aluminum.

Big Time and Money Saver for Rod Mills and Users of Wire and Rod

Ideal for production cutting, trimming off cobbled ends, taking test samples and splitting bundles on docks.

Manco has completely redesigned the Guillotine line of wire and rod cutters now used by major rod mills throughout the world. These new Manco Guillotine units give high efficiency, heavy duty performance, with a 75% slash in tool maintenance costs.

New Interchangeable Blade and Anvil

Interchangeable blade and anvil means wear points can be reversed for virtually double life. Three blade styles for various cutting requirements. There is a new simplified valve design with hardened and ground parts for longer life. Also, new Meehanite piston with large bearing surface and a new piston seal assembly that permits quick replacement.

These Guillotine units powered by Manco Hi-Thrust Electric Hydraulic Pumps

Write for Complete Information

IA-9-D

WRITE FOR CATALOG

Important Note: Also ask about trade-in offer on old model 200 HV-2L, 20 HV-1 and 21 HV-2L.

MANCO MFG. CO., Bradley, Illinois

Please send:

☐ Catalog of new Guillotine Wire and Rod Cutters.

☐ Trade-in information on Guillotine model(s)_____

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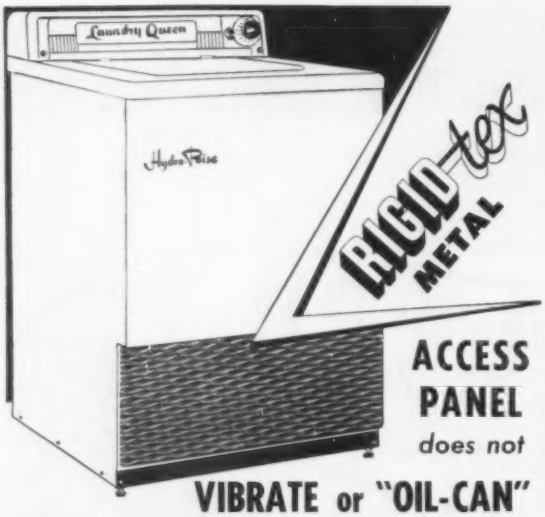

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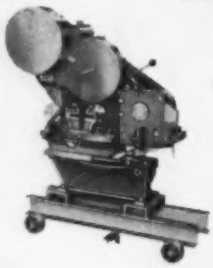

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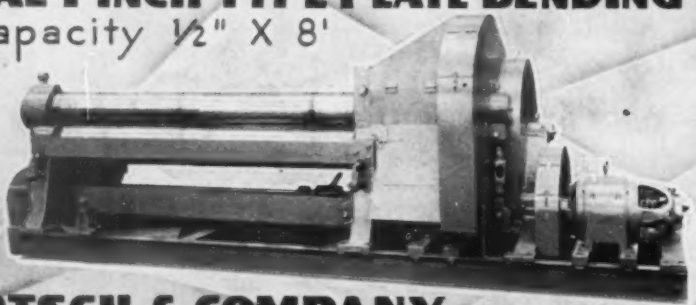

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Light and heavy machinery for all classes of sheet metal, plate and structural work.

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Mr. Harold A. Meyer,
Sales Manager
Hydraulic Press Division
K. R. Wilson, Inc.

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10-TON CAPACITY
BENCH ARBOR PRESS

NEW

MODEL 37KMD
HEAVY DUTY SHOP PRESS

NEW

MODEL 2005 — 2424
FOUR COLUMN PRESS

Reports Mr. Moyer — "Recent months have seen an unprecedented rate of new press development at K. R. Wilson, designers and builders of hydraulic presses since 1916. Among the new presses are a series of Four Column, Guided Platen Presses featuring remarkable versatility and accuracy, and a new 10-Ton Capacity Bench Arbor Press offering many exclusive features. New bulletins have just been released, giving detailed information on new Wilson Presses. You'll find it pays, in terms of greater production speed, accuracy and economy, to request these bulletins *now*."

SEE THESE NEW K. R. WILSON PRESSES IN CLEVELAND

K. R. Wilson will exhibit its newest hydraulic presses at the 38th National Metal Exposition and Congress in Cleveland, October 8 thru 12. See their exclusive features and advantages by visiting Booth No. 2407 in the Upper Exhibition Hall of the Public Auditorium.

38th NATIONAL METAL EXPOSITION AND CONGRESS

Booth No. 2407

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Your dollars will go a lot further if you buy a premium grade solvent. Detrex Perm-A-Clor is a premium grade trichlorethylene . . . available at the same price as ordinary solvent. Perm-A-Clor is mighty important to you because it:

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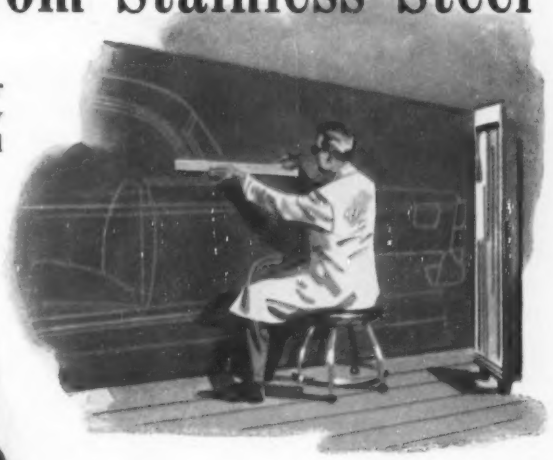

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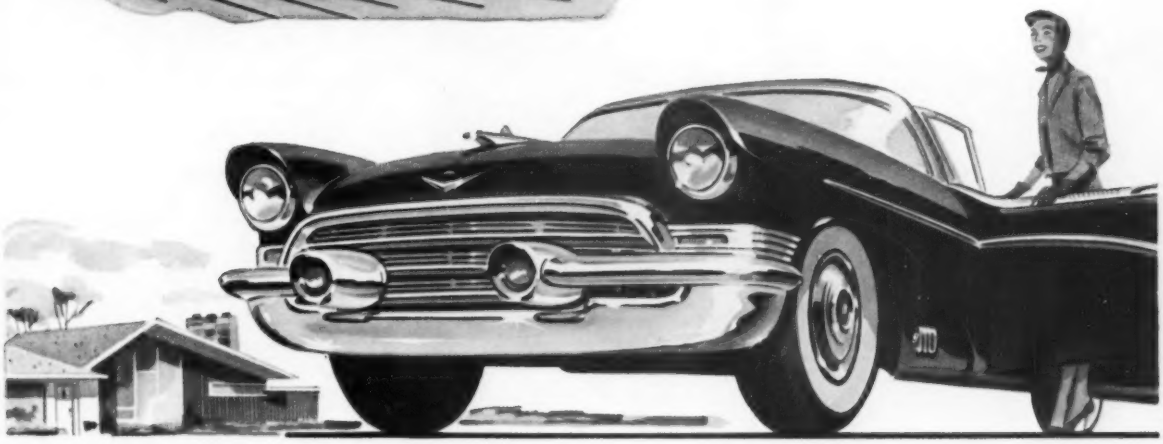

THE PURCHASER from long experience recognizes Stainless Steel as the easy to clean metal that keeps its shape and good looks under the toughest conditions of driving and weather. Also it's a big plus at trade-in time.

McLOUTH STAINLESS STEEL

FOR THE PRODUCT YOU MAKE TODAY AND THE PRODUCT YOU PLAN FOR TOMORROW SPECIFY McLOUTH HIGH QUALITY SHEET AND STRIP STAINLESS STEEL

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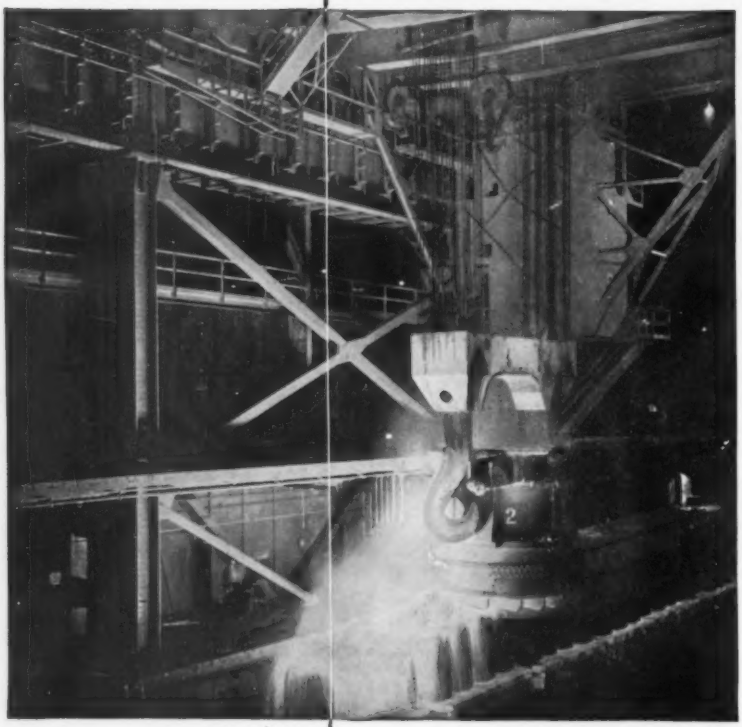
Morgan cranes stop "on a dime"

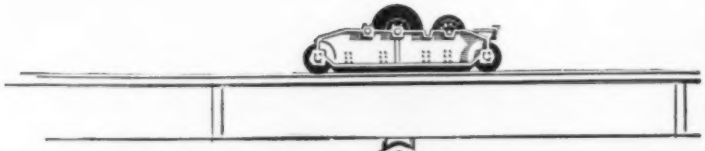
● BRAKING a Morgan crane under full load is as easy as stopping the family car.

Morgan hydraulic crane brakes provide maximum safety and pin-point accuracy in spotting heavy loads . . . another vital link in the chain of features that makes Morgan cranes best in the business.

Performance records prove that advanced design and heavy-duty construction of Morgan cranes make them less costly to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!



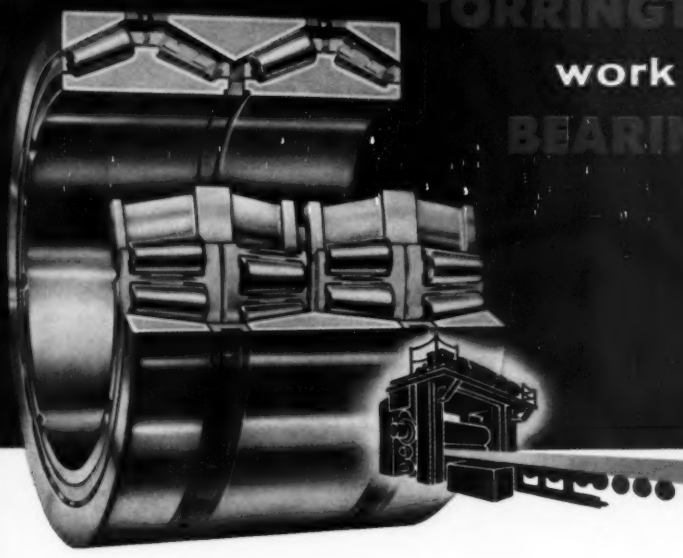
Positive action encourages operators to use the hydraulic brake rather than plug the motor.



The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

THE
MORGAN
ENGINEERING CO. *Alliance, Ohio*

roll higher tonnage records with TORRINGTON work roll BEARINGS



TORRINGTON WORK ROLL BEARINGS are helping to set new tonnage records wherever they are used. And why not! They're designed and built to do just that. Every detail of construction from the electric furnace steel used in their construction to the precision-ground races and rollers work to one objective: to provide the steel industry with the finest bearings possible for long, heavy-duty service. Keep your production rolling to new records. Both two-row and four-row types of TORRINGTON WORK ROLL BEARINGS are standard in a wide variety of sizes. Next time make it TORRINGTON. There's none better.

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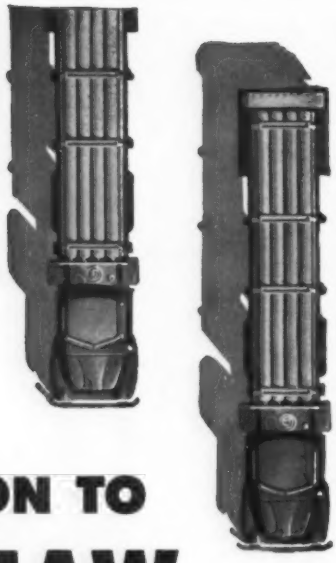
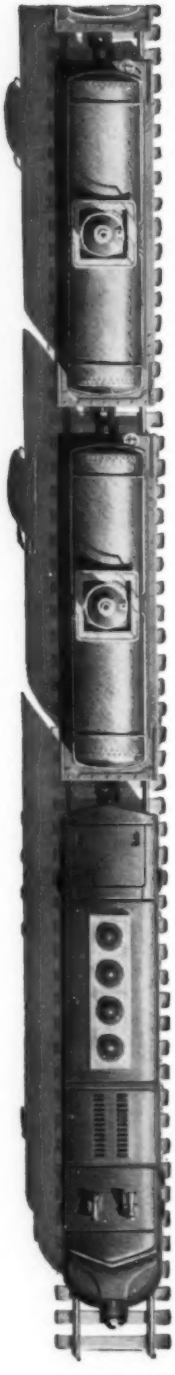
Needle • Ball • Needle Rollers

THE TORRINGTON COMPANY

South Bend 21, Ind. Torrington, Conn.

THE TORRINGTON COMPANY 90th ANNIVERSARY 1866–1956





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anhydrous . . . aqueous

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Lead Fluoborate
Metallic Fluoborates
Potassium Bifluoride
Potassium Chromium Fluoride
Potassium Fluoborate
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Potassium Titanium Fluoride
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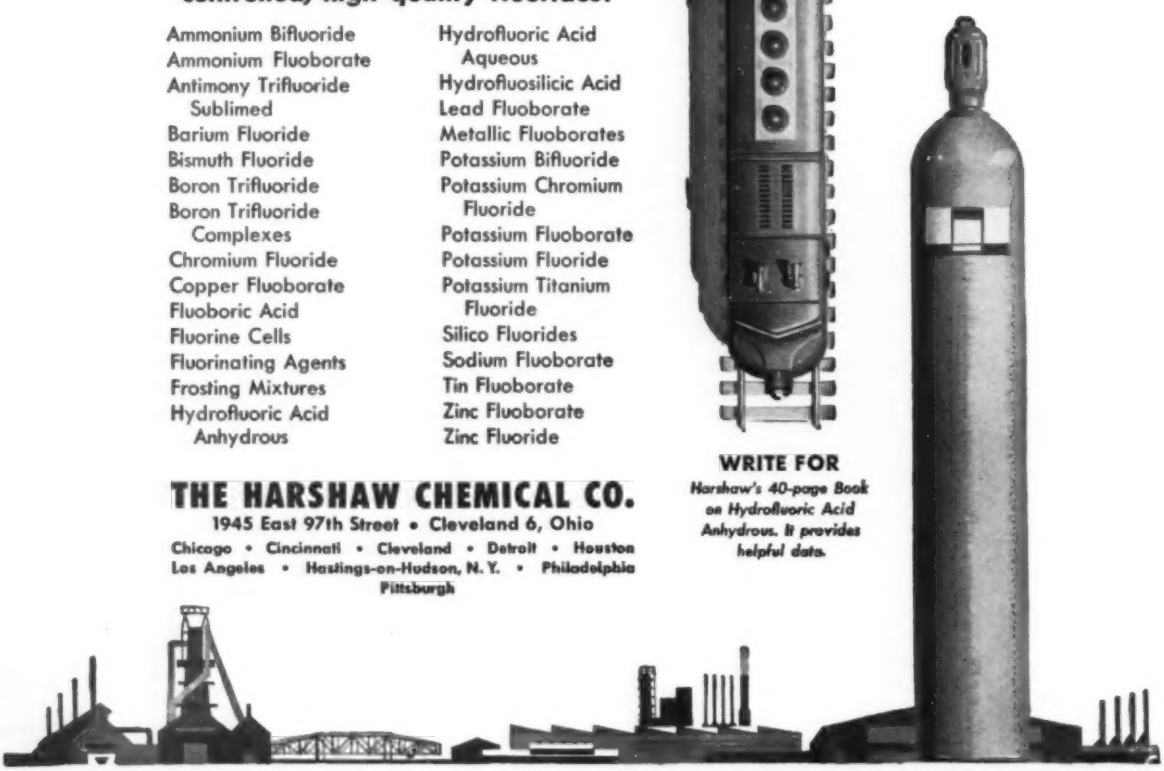
WRITE FOR
Harshaw's 40-page Book on Hydrofluoric Acid Anhydrous. It provides helpful data.



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HARGUS OIL-HARDENING. Ever popular in tool rooms everywhere. HARGUS fits average die applications. Good machinability, top hardness with minimum deformation.

DUMORE 5% Chrome. POPULAR PRICED AIR HARDENING. For die applications, where the non-deforming qualities and safety in hardening are necessary, and high die shock resistance is desired.

WIZARD UNBREAKABLE TOOL STEEL. Truly, "Unbreakable to the maximum." WIZARD was designed to produce the greatest toughness at 55 maximum Rockwell "C" hardness, plus, if desired 60-62 "C" surface hardness when quenched from carburizing pack.

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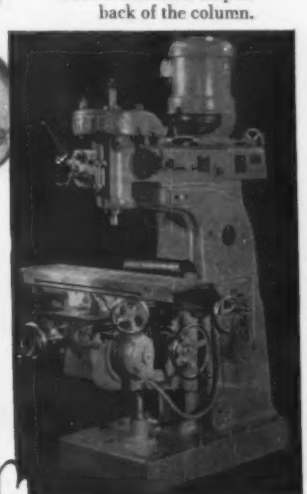
SAVE TIME and MONEY

with **Ruthman** GUSHER coolant pumps

This milling machine, manufactured by George Gorton Machine Company, is equipped with a Ruthman Gusher Coolant Pump in back of the column.



Operating and maintenance costs are reduced when you specify Gusher Coolant Pumps. You get split-second coolant flow . . . controllable as to volume. There is no priming or packing needed. Heavy-duty pre-lubricated ball bearings and electronically-balanced rotating shaft give you long life with minimum cost of maintenance. We will be glad to advise you on your coolant problems.

Model 5-P 3

THE **RUTHMAN** MACHINERY CO.

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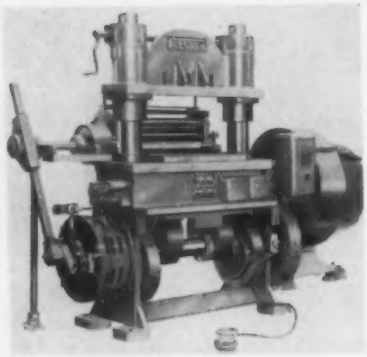
NEW EQUIPMENT

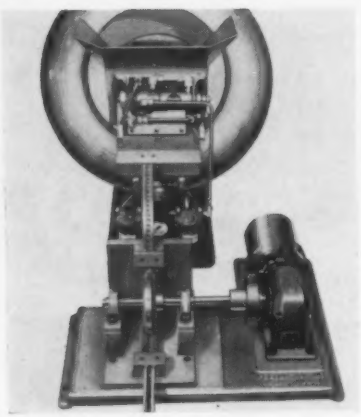
New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 257 or 258.



Foil stamper suitable for high production

Improved design changes allow a punch press to adapt to large quantity production of aluminum foil containers. A roll feed is mounted on the bolster plate to feed aluminum coil stock 24 in. wide. Roll feed has an advance from zero to 14 in. Pressfeed has a five in. stroke and operates at a variable speed from 60 to 125 strokes per minute. Eccentric weight counterbalance is installed on the underneath main shaft to counterbalance ram's weight. Open throat design enables roll feed from front to back. Low center of gravity with underneath pull down double cranks has a further advantage in obtaining a speed of 125 strokes per minute with a five or six in. stroke. Presses are single geared. Ram area working surface is 10 x 24 in.; bed area, 16 x 24 in. Rated capacity is 50 ton. *Diamond Machine Tool Co.*

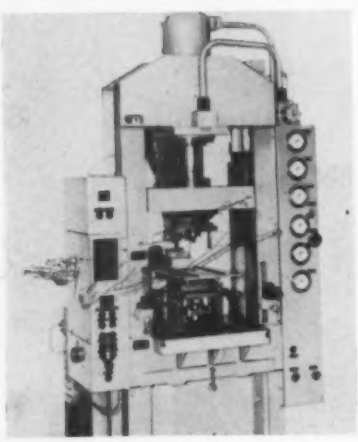
For more data circle No. 64 on postcard, p. 257



Standard unit automatically feeds clinch nuts

Available in two basic hopper sizes, a standard rotary type hopper automatically feeds clinch nuts. The two sizes are: 18 and 24 in., equipped with either gravity or power feed. One or two tracks can be used on the 18 in. hopper, and up to four tracks can be used on the 24 in. hopper. Rated output per track ranges from 150 to 250 pieces per minute. The feeding system operates on a fully enclosed, continuous duty motor, equipped with a slip clutch for overloads. Gears are mounted on ball bearing shafts throughout, for heavy duty service. All gears and bearings operate in an oil bath. The hopper has a three-point mounting for easy installation on rough or uneven surfaces. Clinch nut feeders are available as a complete system with hopper, track and gravity feed, or hopper and tracks with gravity feed. Specially designed dies can be furnished. *Feedmatic-Detroit, Inc.*

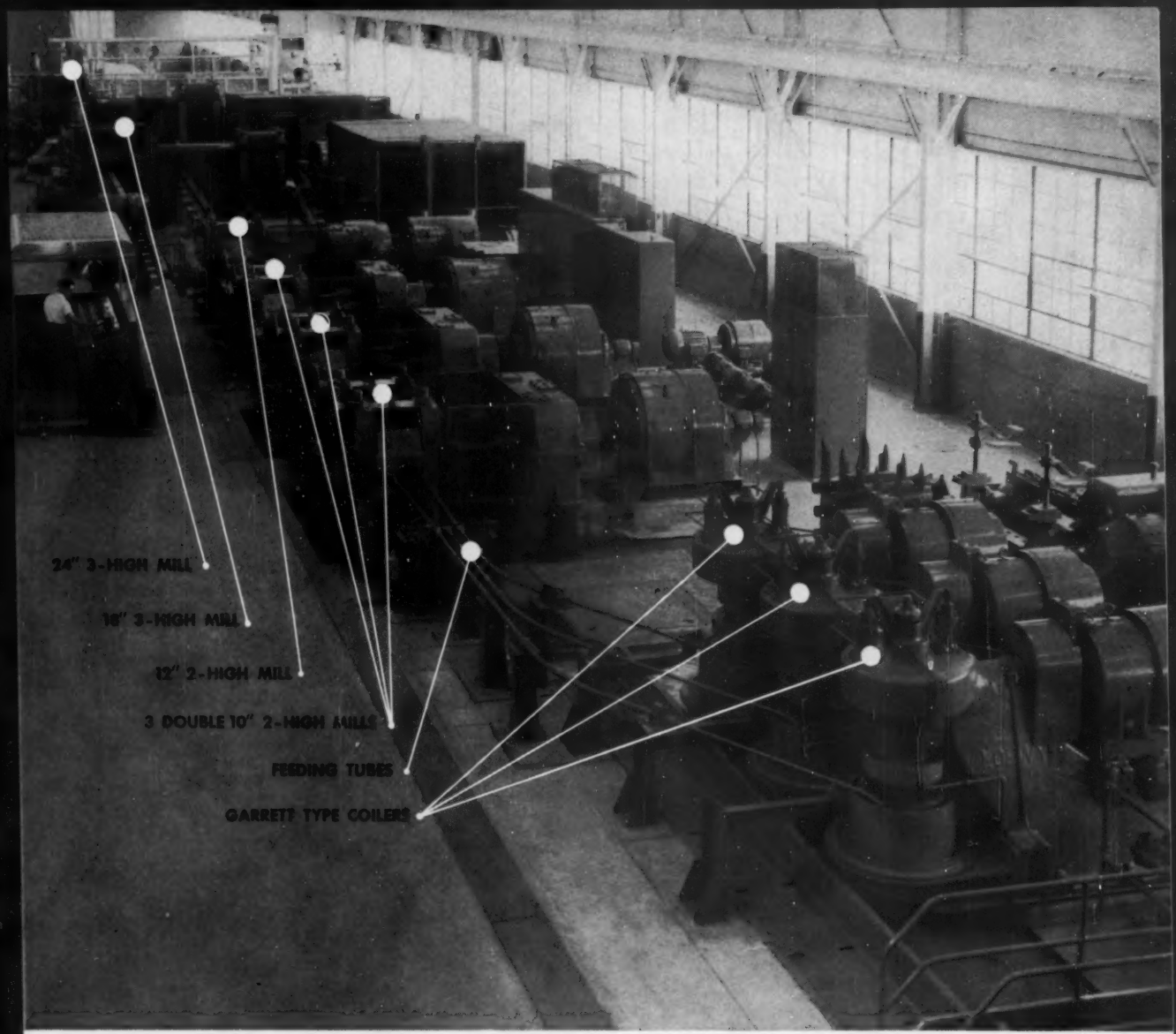
For more data circle No. 65 on postcard, p. 257



Press features hydraulically floated die table

Outstanding feature of this metal powder press is its hydraulically floated die table with an adjustable hydraulic resistance. Tools permit the compacting of parts having many projections in the pressing plane without additional built-in press movements. Other features include a variable pressure dwell period and an upper cylinder delayed return stroke. An automatic distance-dependent stroke deceleration allows for pressure valves as low as two pct of the total capacity. Both distance-dependent and pressure-dependent controls maintain close tolerance on compact height. The filler box is hydraulically operated and the shaking cycle can be regulated from zero to 20 movements. All tool adjustments and most press adjustments are made between the press platens. This allows as much as 39 in. of working space. The press occupies only 4 x 5 ft floor space. It is 10 ft high. Unit requires no special foundation or pit. *Mannesmann-Meer Engineering & Construction Co.*

For more data circle No. 66 on postcard, p. 257



This installation has a capacity of 40,000 lbs per hour for 2-strand rolling with finished coil delivery every 19 seconds.

new Loewy copper wire rod mill reduces wire bars to 5/16" wire rod, automatically

At the plant of a leading manufacturer of electric cable, this new Loewy mill is rolling 5/16" and 7/16" copper wire rod from standard wire bars in a continuous, fully automatic operation.

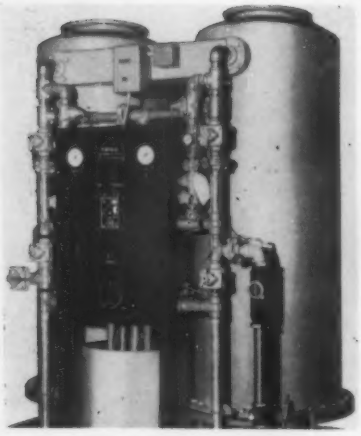
The mill consists of two 3-high roughing mill stands, seven continuous finishing stands and three Garrett coilers. Copper wire bars are conveyor-fed into the furnace. After leaving the furnace the ingots are rolled down in 14 passes to finished size. Leaving the last stand at a speed of 2400 FPM the wire is coiled. The coils are tied and conveyed into a pickling line. The entire procedure is automatic and all operations are controlled from one operator pulpit.

Like this high-speed wire rod mill, all Loewy equipment is designed to produce more, in less time, at lowest cost. We design, build and install blooming and slabbing mills, plate mills, structural and rail mills, bar and skelp mills, continuous billet and strip mills for ferrous and non-ferrous metals as well as high-speed foil mills. For illustrated bulletin 14002, write Dept. 316, Loewy-Hydropress Division, BLH Corporation, 111 Fifth Avenue, New York 3, N.Y.

BALDWIN BLH LIMA-HAMILTON

LOEWY-HYDROPRESS
BALDWIN-LIMA-HAMILTON

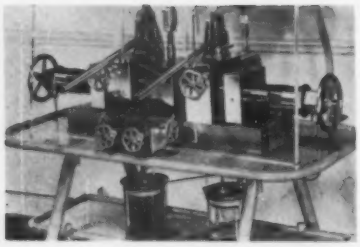
DIVISIONS: Austin-Western • Eddystone • Hamilton • Electronics & Instrumentation • Lima • Madsen • Loewy-Hydropress • Pelton • Standard Steel Works



System demineralizes at flow rate of 2500 gph

Operating on dual column ion exchange principles, a new addition to one company's line of industrial demineralizers features a fully automatic regeneration system. This includes rinsing and recutting in the effluent when a desired preset purity standard is reached. Unit's capacity is 2500 gph of demineralized water with a purity of less than two ppm. All operating functions are automatic. When effluent purity falls below the desired standard originally set by the operator, the unit automatically stops delivering treated water; the need for a regeneration cycle is signaled. This cycle is initiated by setting one switch. It completes itself entirely automatically. Unit's columns are rolled steel, butt welded, 100 pct plastic lines. Underdrain system consists of perforated stainless steel plate on top of which a plastic screen rests. This system produces excellent distribution results and eliminates space-consuming distributing media. *Penfield Mfg. Co.*

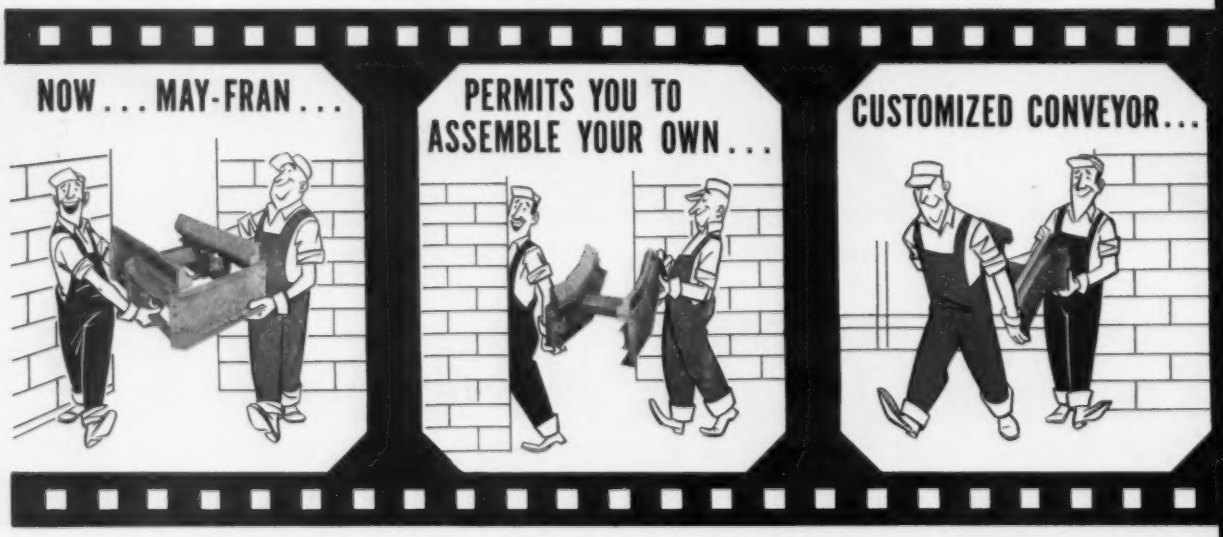
For more data circle No. 67 on postcard, p. 257



Presses have 150,000 and 75,000 psi capacities

Precision-built 150,000 and 75,000 psi presses include a cylindrical pressure chamber of high alloy steel, two hand pumps, an intensifier, screw press, two connection blocks, two balanced end-valves and a dimension block. The presses are complete units mounted on baseplates. To obtain 150,000 psi, pressures a hand pump actuates an intensifier with a ratio of 1 to 30. Thus, with a pressure of 5000 psi in the pump, pressure in the main cylinder becomes 150,000 psi. *North American Philips Co., Inc.*

For more data circle No. 68 on postcard, p. 257



Whether you give first consideration to cost . . . or to the overall efficiency of an installation . . . the MAY-FRAN CONVEYOR STANDARDIZATION PROGRAM provides benefits never before possible.

Through STANDARDIZATION, you now can build your own CUSTOMIZED conveyor to meet your own individual needs. The MAY-FRAN components . . . mass produced . . . can be assembled into virtually any type of hinged-steel conveyor for the handling of stampings, formed metal parts, forgings, automotive scrap, chips and turnings.

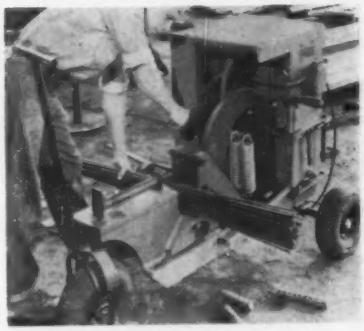
Straight sections . . . concave or convex sections . . . take-up and discharge-end sections can be furnished to meet specific requirements of belt width as well as load bearing and volume capacities.

These pre-fabricated units are available rapidly and at low-cost. You save money many ways with MAY-FRAN standardization because . . . conveyors can be assembled by your own plant personnel . . . conveyors can be modified in any way when production needs change . . . conveyors can be dis-assembled and moved to other plant locations.

Bar croppers cut rods to two in.

Hydraulic bar Croppers of Swedish design cut rods up to 2 in. in diameter at up to 22 cuts per minute. The new croppers are fully hydraulic in operation, with an automatic return stroke. They withstand up to 150 ton, with normal working pressure of 75 to 90 ton. Stationary or portable models are available, either electric motor or gasoline powered. Slide rail mounting accommodates any electric motor. All models feature a cutter which provides eight separate blades. Cutter can be turned so as to use all eight edges in succession as they slowly wear down. The machine cuts rods up to 1¼ in. at 10 to 12 cuts per minute. A larger model requires 4.5 hp and cuts 1¼ in. rods at 20 to 22 per minute. *Larson & Co.*

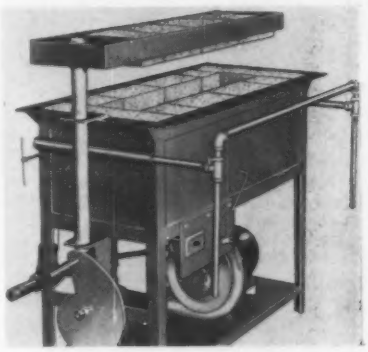
For more data circle No. 69 on postcard, p. 257



Forge furnace rated at 370,000 Btu per hour

Rated at 370,000 maximum Btu per hour, a new gas fired forge furnace provides high, fast heat for sharpening and forging parts and tools. It burns all types of gas and is equipped with four burners with separate shut-off valves on end burners. The forge has a body of heavy steel. Its firebox is heavily insulated. The firebox measures 5½ in. wide, 7½ in. deep and 27 in. long. All wearings surfaces are constructed of hard firebrick. The refractory lid is mounted on a pivot pole. It is adjustable. Dimensions of the new forge furnace are: 30 in. high overall and 40 in. long. Its shipping weight is listed at 540 lb. The equipment was designed and manufactured for intended use in blacksmith shops, machine shops and vocational purposes. *The Johnson Gas Appliance Co.*

For more data circle No. 70 on postcard, p. 257



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Simplify Your
BURRING, SMOOTHING
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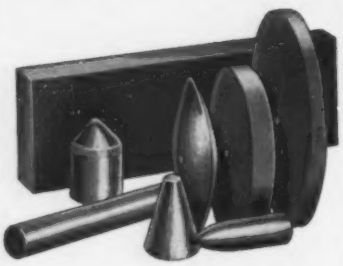
CRATEX
RUBBERIZED ABRASIVES

"cushioned action performance"



Today's changing manufacturing picture — new production methods, new metals, increased use of plastics, new finishes, the rise in labor and material costs — all of these factors deserve the consideration and use of Cratex Rubberized abrasives for:

BURRING • SMOOTHING • POLISHING
Cleaning, Blending, Lapping, Finishing and Trimming Operations

CRATEX Rubberized Abrasives are made in four "grit-types" from coarse to extra fine —and over 160 standard sizes in—

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ideal for Machine or Manual application on hard or soft **Metals, Plastics, Glass** and scores of other materials.

Backed by 30 years of industrial, professional and technical application-performance, CRATEX Rubberized Abrasives have achieved an unduplicated reputation for lowering "unit costs" with unparalleled results in burring, smoothing and polishing operations. Investigate Cratex Rubberized Abrasives . . . "The World's Finest For Industrial Use" . . . send today for Descriptive Catalog which gives full details, applications and prices.

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Cratex abrasive engineers will gladly, without charge, analyze your individual production operations and recommend the correct "rubberized abrasives" to lower your production costs and to meet your burring, smoothing and polishing problems. Check the coupon for—"Application Analysis Form."

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INDIVIDUAL
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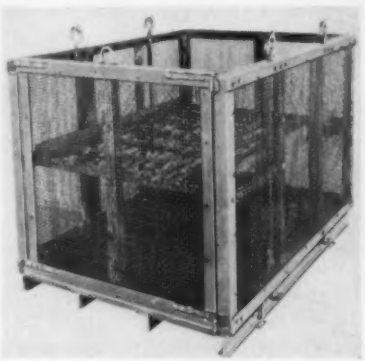
CITY ZONE STATE

Steel basket

A sturdy steel basket is specially constructed for moving heavy aluminum castings to and from heat treating furnace and quenching tanks. The basket's unique structure, with its four lifting hooks, makes it easy to lift the castings by means of a movable crane. In addition, unneccessary secondary handling is entirely eliminated; a specially constructed door in the front of the basket facilitates unloading. Basket measures 84 x 60 x 51 in. deep. Frame is made of 3 x 3 x ⅜ in. angles. Four lifting hooks are made of 1-in. square bar



stock. The ¾ in. space, 0.162 in. diam wire mesh and angle frame are bolted to one another. A 57 x 75 in. shelf adds to the versatility of the furnace basket in innumerable applications. Each basket weighs approximately 2000 lb and can handle a workload exceeding 10,000 lb. *Wiretex Mfg. Co., Inc.*

For more data circle No. 71 on postcard, p. 257

Spline shaft hobber

Six various cutter speed and feeds change by means of electromagnetic multi disk clutches with a new single purpose spline shaft hobbing machine. It also hobs spur gear pinions. All the gears are ground and hardened and in constant mesh. Speed and feed changes can be effected during operation by preselection. Main cutter spindle runs in four high precision anti-friction bearings. Suited for conventional as well as climb hobbing, it can be preset for fully automatic cycling. Splines of four diametral pitch up to 25¼ in. length can be hobbed. *Eric R. Bachmann Co., Inc.*

For more data circle No. 72 on postcard, p. 257

These are typical of the many piece parts being balanced on the *low* cost, *high* production

TAYLOR

HI-EFF

BALANCING MACHINES
with
Speed Button Control

Send your piece parts for sample balancing or drawings for recommendations by Taylor engineers.

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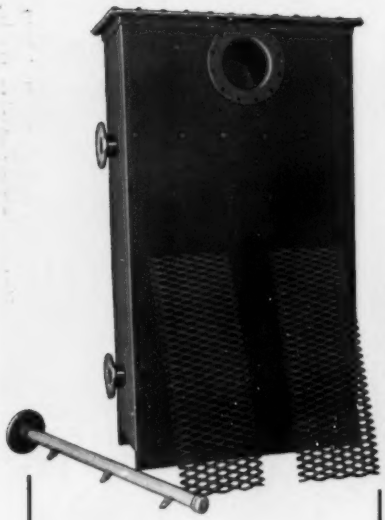


KNIGHT FUME EXTRACTORS

KNIGHT Fume Extractors are designed particularly for the elimination of corrosive fumes from metal pickling, plating, and finishing operations.

Fume extractors not only remove the entering acid fumes; but also, by the action of an internal entrainment eliminator, prevent the formation of mist from the scrubbing liquid. There is no objectionable acid fog being discharged into the atmosphere. In addition, acid effluent to the sewer can be eliminated by recirculation of a caustic solution in the extractor.

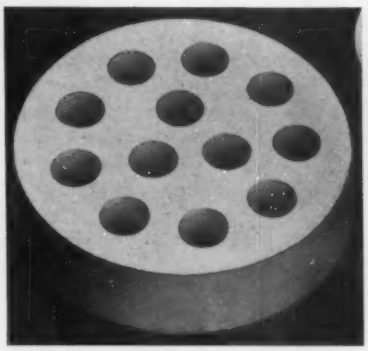
1) High scrubbing efficiency
2) Corrosion resistant throughout
3) High capacity, wide operating range
4) Low pressure drop, low power costs
5) No moving parts, simple to operate
6) Self cleaning, easily maintained

Consult KNIGHT engineers for assistance in the design of fume removal systems for your sulfuric acid tubs, chrome plating operations, or bright dip tanks.

Maurice A. Knight
39 Kelly Ave.
AKRON 6, OHIO

Strainer cores

Made by a special formula, a new line of refractory strainer cores keeps slag and sand core inclusions out of castings and permits close



control of molten metal. They withstand 3000°F. temperatures without spalling or disintegrating. Field tests of full one minute pours resulted in no damage whatever to the cores. They are available in various sizes up to 4¼ in. diam or on special order, in sizes to meet specifications. *Star Porcelain Co.*

For more data circle No. 73 on postcard, p. 257

Tractor-shovels

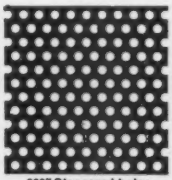
Two new four-wheel-drive, pneumatic-tired tractor-shovels have payload capacities of 1¾ cu yd (1 1/3 cu yd struck) and 1 1/3 cu yd (1 cu yd struck). Neccessity of coming to a stop for a "range-shift" is eliminated with a new "no-stop" transmission since all shifts in both forward and reverse

can be made without even slowing down. Finger-tip directional control can be operated under full engine speed, in any gear. Torque-converter gives infinite speed ratios. Both transmission and torque-converter use standard SAE-10 HD oil. Special, expensive oils are not required. *Frank G. Hough Co.*

For more data circle No. 74 on postcard, p. 257

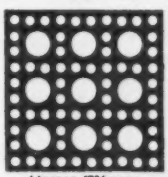
Perforated Materials for *Every* Application

Contact H & K for any perforated materials your product may require.



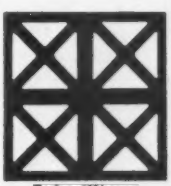
.060" Staggered holes. 126 holes per sq. in. 3/32" centers. 36% open.

We will be glad to work with you on your perforating problems.



Lincane 47% open

Perforating all metals, Masonite, plywood, paper, cloth and plastic.



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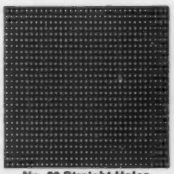
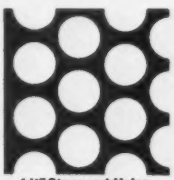
Fill-in and mail coupon to office and warehouse nearest you.



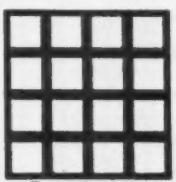
No. 00 Straight Holes 952 holes per sq. in. .020" diam. 30% open.

We have tools for perforating thousands of different patterns.



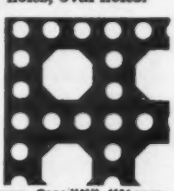
1/4" Staggered Holes. 5/16" centers. .29" diam. 58% open.

See our catalog in Sweet's Product Design File.



Two-tenths square, 64% open.

Round holes, square holes, slots, ornamental patterns, oblong holes, oval holes.



Cane "41" 41% open.

THE Harrington & King PERFORATING CO.

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- ☐ STOCK LIST of Perforated Steel Sheets
- ☐ SAMPLES of Perforated Plastics and Paper
- ☐ PRICE INFORMATION (NOTE: Send specifications of perforated materials wanted. If necessary send drawings or sketches.)

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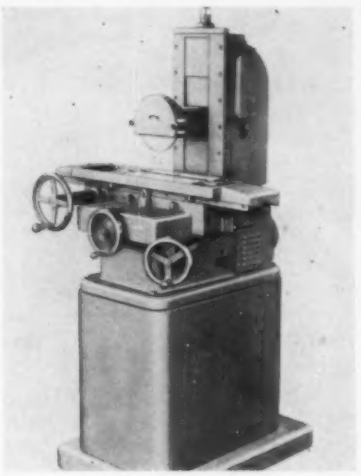
COMMISSIONER OF COMMERCE

Automation in practice

Big machine performances is claimed for this low cost precision 6 x 12 in. hand feed surface grinder. Its elevating handwheel is located below the level of the table. This handy location places wheel graduations and point of grinding wheel contact with the work where the operator can see both simultaneously. It also eliminates reaching overhead when bringing the grinding wheel down. The floating dial pointer eliminates the need to add or substract when determining amount of stock removal. A smooth timing belt drive actuates the table. There is no rack and pinion. The lead screws are made from long-



wearing lead screw steel; they are precision ground. Hand chrome table ways insure long-lived accuracy and eliminate periodic rescraping. A special plating process applies a hard chrome surface to the V and flat ways. *Covel Mfg. Co.*

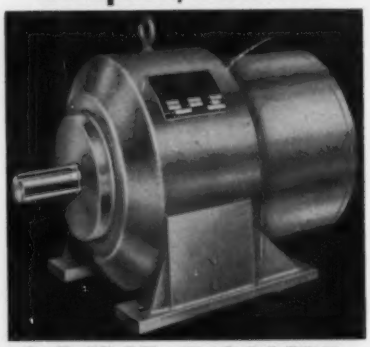
For more data circle No. 75 on postcard, p. 257

Work benches

Steel work benches featuring double drawer sections, drawers and cabinet, double cabinets, and sliding-door enclosed storage beneath work surface have been added to one firm's line. In this huge selection (161 models) all have matching contours and dimensions. Four different types of tops are available including 12 gage steel, masonite covered steel, laminated wood, or resinwood. *Equipto Co.*

For more data circle No. 76 on postcard, p. 257

Compact, Efficient



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GEARMOTOR

These modern GearMotoRs offer the simplest, most reliable and compact machinery drives obtainable . . . featuring real economy in lowered original cost, and reduced maintenance through long years of trouble-free service. Philadelphia GearMotoRs are extremely compact and efficient. They are highly resistant to moisture, chemical fumes and abrasive dusts . . . Helical gearing with crown-shaved teeth assures ultra-fine surface finish, controlled contact at center of teeth, plus long, silent service life . . . Two-way seals lock-in oil and lock-out dirt . . . Heavy shafting of heat treated alloy steel eliminates bending or twisting under heavy loads . . . Oversize thrust bearings can handle big overhung loads . . . gear units and integral motors conform to AGMA and NEMA Standards.

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UNIT TYPE	MODEL	H. P.	RATIO
SINGLE REDUCTION		1-60	1.25:1 to 5.06:1
DOUBLE REDUCTION		1-60	6.20:1 to 31.4:1
TRIPLE REDUCTION		1-40	38.5:1 to 158.9:1

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The Airco 312 is an all-position mild steel electrode designed to produce weld metal possessing not only excellent mechanical properties but also low hydrogen content. The arc action is relatively quiet, resulting in low spatter. The molten steel is not turbulent. For welding steels when the exact composition is not known.

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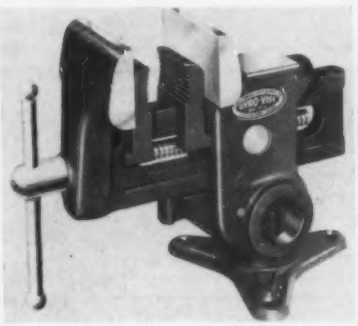
Wide jaw vise

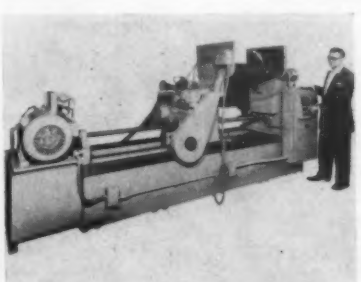
Increased jaw width plus removable and replaceable pipe jaws are features of a new vise. It has a jaw width of 3½ in. Jaw depth is 2½ in. and jaw-gripping area 7⅞ in. Maximum jaw opening is 5 in. Pipe capacity is ⅛ to 1½ in. Another new feature is a 1¾ in. square polished anvil surface. Vise operates on a round base on which it can be turned and locked in any desired position. It may be used upright, laid flat on either side or placed at any required angle. Vises are 8½ in. high and weigh 16½ lb. *The Columbian Vise & Mfg. Co.*



For more data circle No. 77 on postcard, p. 257

De-burring unit

This combination de-denting and de-burring machine makes possible removal of the dent caused by cut offs. It de-burrs as well as chamfers or faces both ends of a tube simultaneously. Mechanically and hydraulically operated, the machine can de-dent and de-burr tubing of ¼ in. to one in. in diameter and 1½ in. to 10 ft in length. Unit does this in excess of 3000 pieces per hour. *Tubco Industries, Inc.*



For more data circle No. 78 on postcard, p. 257

ULTRASONIC

Gaging from One Side

VIDIGAGE®

DIRECT-READING

THICKNESS GAGE

Gaging a section of a large spherical tank at Wyatt Metal & Boiler Works, Houston, Texas

VIDIGAGE® 14″ or 21″ Cathode-Ray Screen with infinite choice of Direct-Reading Scales between 0.005″ and 2.5″ of steel, and accuracy between 0.1% and 1.0%. Measures from one side; detects laminar flaws. Extension cables up to 1,000-ft. for testing in remote locations.

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ENGELHARD INDUSTRIES

Self-leveling mount

This "truly universal" machinery mount speeds installation and relocation of all types of equipment, stops vibration transmission, and lowers noise levels. The versatile damper promises to accommodate all job conditions without job-site alterations. Features include: (1) internal leveling adjustment permits installation anywhere under

the machine, regardless of position or availability of bolt holes in base, (2) no bolting to mounting because of a non-skid felt pad on the top plate; however, the mounting *can* be cemented, or bolted through the tapped hole provided, and (3) the damper can be cemented to the floor if desired. *Korfund Company, Inc.*

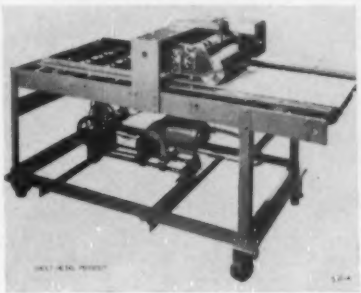
For more data circle No. 79 on postcard, p. 257

Hydraulic presses

One company's line of 10 and 20 ton hydraulic presses has two additions. Operation of both appears simple and efficient. A slight movement of the control lever starts ram motion. Ram may be slowed or stopped at any point. At bottom of the stroke, the control lever is released; ram returns automatically to a pre-set stop. This may be set any distance from ¼ in. to the full stroke of 12 in. Frames are of rugged construction and will stand force far in excess of rated tonnage. The 7½ ton model is available with closing speed up to 265 ipm, pressing speed up to 240 ipm, and return speed up to 400 ipm. The 15 ton model is available with closing speed up to 270 ipm, pressing speed up to 120 ipm, and return speed up to 345 ipm. *Northern Tool & Machine Co.*

For more data circle No. 80 on postcard, p. 257

Marker imprints up to 2800 metal sheets per hour



Symbols, numbers, codes, trademarks or descriptions can be printed onto sheet metal with a new printer. It imprints sheet zinc, aluminum, magnesium, steel, copper or plastic. Easily interchangable rubber plates and compatible inks accomplish the process. It can also lay on laminate coatings. Standard machine handles sheets 0.025 to 0.250 in. thick, 14 to 24 in. wide, and 34 to 42 in. long. Printing area is 13 in. wide, and is adaptable up to 2800 sheets per hour, depending on sheet size and operator proficiency. *Industrial Marking Equipment Co., Inc.*

For more data write-in No. 81 on card, p. 257

Strippable coating prevents oil damage

Special non-oil strippable protective coatings are being made for applications such as masking surfaces in plating, or etching operations. They have a water-white clarity which facilitates cutting the mask. Its non-oil exuding feature makes it applicable to a great many materials that may be harmed by contact with oil. This very tough, high tensile strength compound can also be used as a component. *Bischoff Chemical Corp.*

For more data write-in No. 82 on card, p. 257

SILENT HOIST
KRANE KAR

"HAS GIVEN US EXCELLENT SERVICE AT LOW MAINTENANCE COST," says ATLAS FORGINGS COMPANY CICERO, ILL.

"KRANE KAR Unloads freight cars of billets weighing up to 6000 lbs.... Stacks them in yard... Transports billets to saw shop... Loads forgings on trucks for shipment. KRANE KAR is easier to use than our old stationary crane, and saves us time. Now we can make full use of our yard for billet inventory." Ask for Bulletin #79.

Ask about our Lease-a-KRANE KAR-Plan ... 1 to 3 Year Lease with Option to Purchase.

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Portrait by Fabian Bachrach

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Mr. Clement's interest in employee security and Payroll Savings extends beyond his company's Payroll Savings Plan. As a member of the Treasury Payroll Savings Industrial Advisory Committee, Mr. Clement gives freely of his time and counsel to the expansion of the Payroll Savings Plan throughout industry and business.

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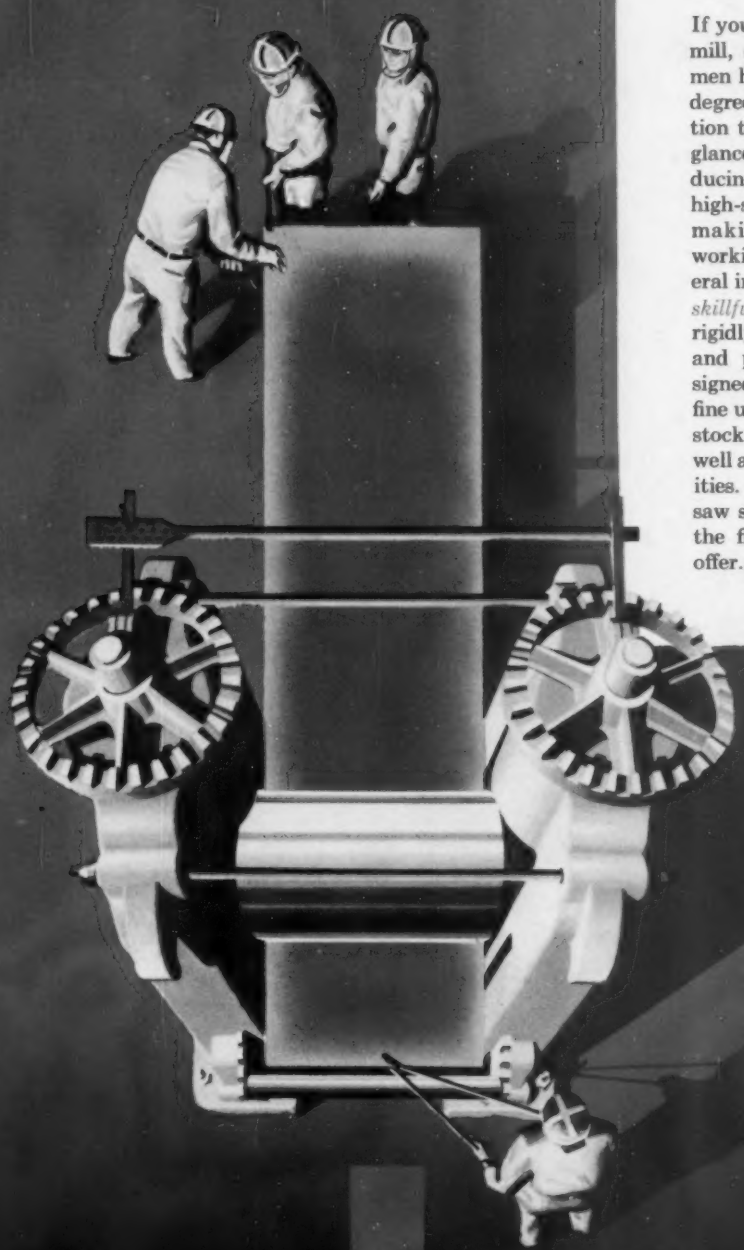
The IRON AGE

How Jessop skill makes better saw steel



If you could peer down into the Jessop mill, chances are you'd see groups of men hand-rolling sheets of steel with a degree of skill and careful concentration that might seem excessive at first glance. *Yet it isn't.* These men are producing a very special steel—top quality high-speed sheet which is used in the making of hack-saw blades, woodworking tools, metal-slitting saws, general industrial knives, and the like. But *skillful finish rolling isn't all.* Jessop rigidly controls its melting formulas and pours small ingots specially designed for cross rolling. This insures a fine uniform grain structure so that the stock blanks well, forms well, swages well and has superior edge holding qualities. Remember, when you order your saw steel from Jessop, you are buying the finest that Jessop experience can offer. *And that's mighty fine steel.*

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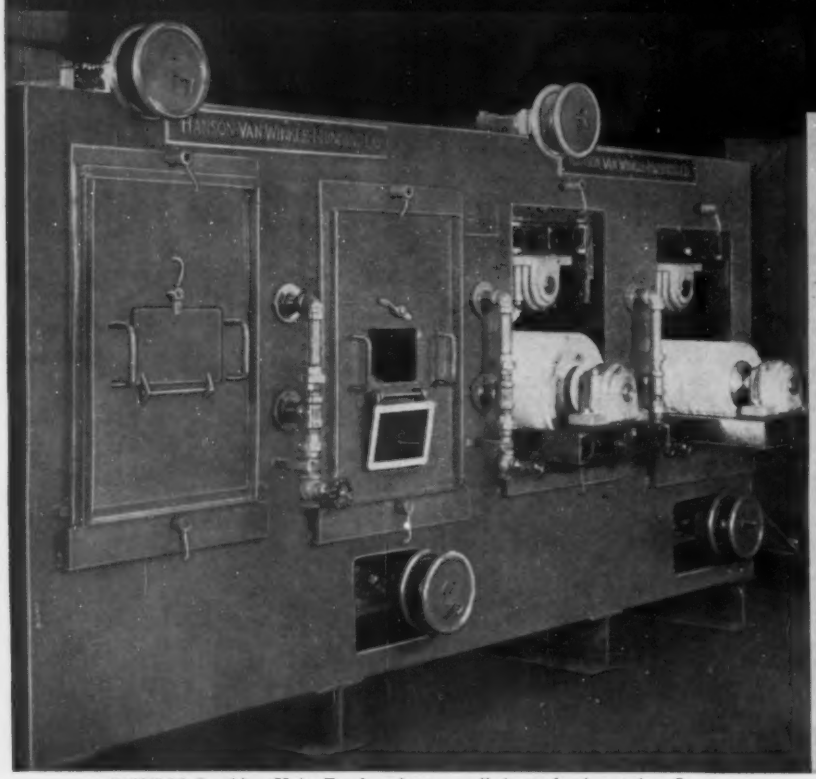

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H-VW-M Scrubber Unit. Brush units are pulled out for inspection. In a matter of minutes they could be replaced, if necessary with new brushes.

...and no down time either! Brushes are replaced easily while unit is in operation!

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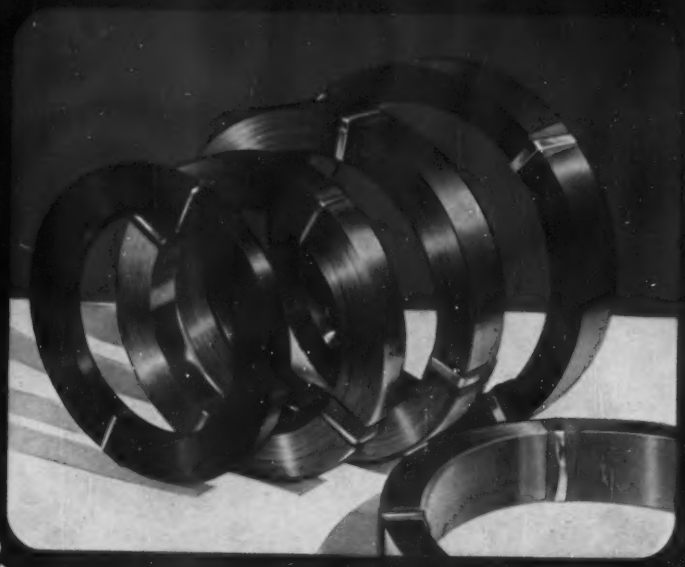

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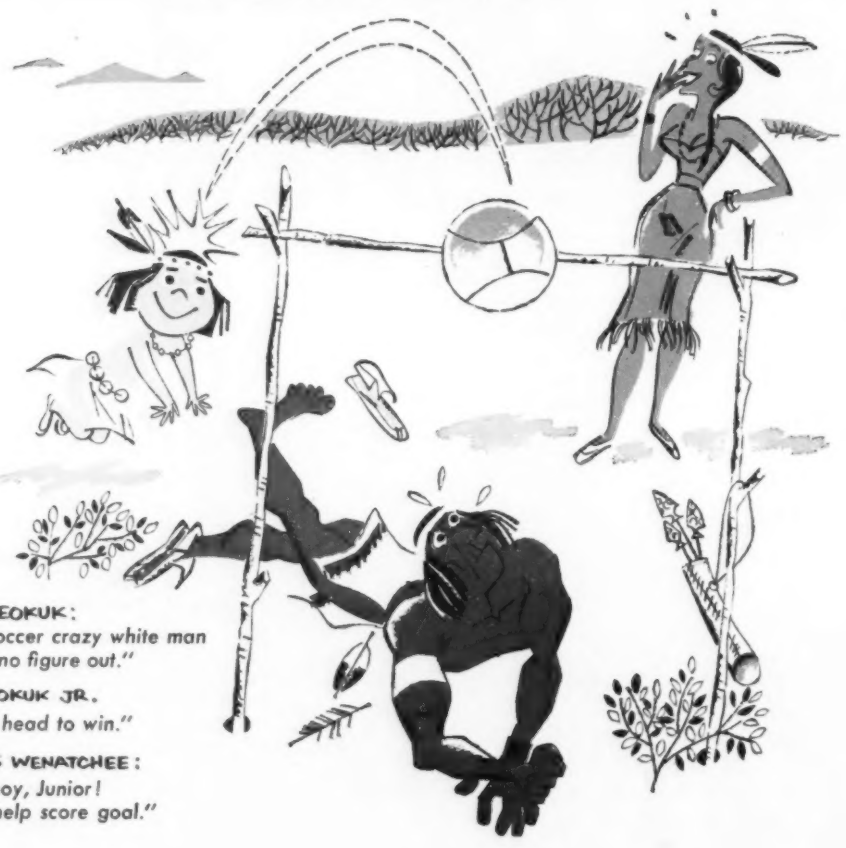
"HEADWORK" SCORES GOAL FOR JUNIOR

(or how control helps win the game!)



CHIEF KEOKUK:
"Ugh! Soccer crazy white man game — no figure out."

CHIEF KEOKUK JR.
"Me use head to win."

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"Smart boy, Junior! Control help score goal."

In soccer, football, baseball or any sport it pays to use control. It pays also in processing iron and steel. Many foundries and steel plants are controlling costs and quality with Keokuk Silvery Pig Iron . . . the superior form of silicon introduction. Pig for pig, car for car, its uniformity never varies. Handle it by magnet . . . charge it by weight (or count the piglets for equal accuracy). Leading aluminum producers specify Keokuk Silicon Metal for uniform high purity. When you think of silicon, think of Keokuk!

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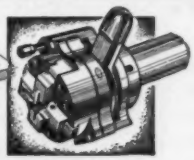
H&G Insert Chaser DIE HEADS



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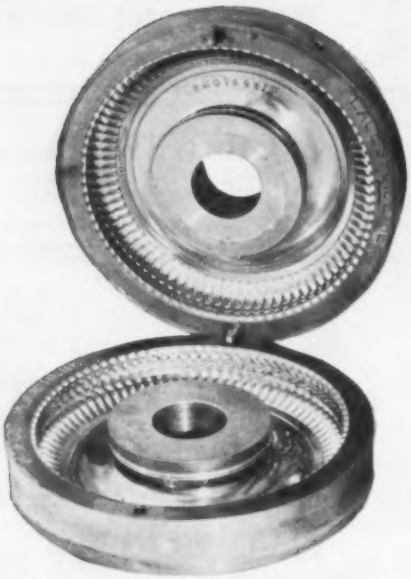
STEEL MACHINING CASE STUDY

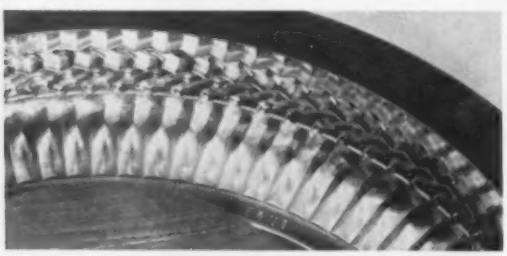
How $30 worth of steel plate took the risk out of a $4000 machining job!



There's a quick, sure way to select exactly the right steel—whatever your particular application. Draw on the wide experience of Ryerson specialists who are working with hundreds of other steel users on similar problems every day. The right steel can make a big difference—can mean a better product, lower production costs—as the following case study illustrates.

THE PROBLEM—Central Mold & Machine Company of Akron contracted to make a chrome-plated mold for producing an exact duplicate, in miniature, of Firestone's new Supreme tubeless tire.

Only a very small piece of plate steel was needed for the job—but the steel had to be extraordinarily clean and sound. Hundreds of hours of machining time were to be "invested" in it and some of the tiny lands that formed the unusually intricate tread design were only .015 of an inch thick!



A close up of the mold for the 6" tire showing intricate machining with lands only .015" thick.

SOLUTION—Working with a Ryerson representative, Central Mold & Machine selected New E-Z-Cut plate for the job. Because this Ryerson leaded plate steel is remarkably clean and free of excessive stringers, even the finest lands of the mold were sharp and true. Because New E-Z-Cut machines as much as 30% faster than mild steel plate, the difficult machining job was completed in minimum time. And because New E-Z-Cut machines to a high finish and polishes readily, the mold was very satisfactorily prepared for plating, at low cost.

If a better quality free-machining plate had been available at any price it would have been used here because, at almost any price, the cost of the steel would be only a tiny fraction of the cost of the finished mold. New E-Z-Cut (approximately $30.00 worth) was used because it took the steel risk out of a $4000 machining job.

Whatever your steel problem, it will pay you to check with Ryerson specialists and draw on Ryerson stocks of highest quality, special purpose steels.

NEW E-Z-CUT PLATE VS. MILD STEEL
A Machining Demonstration
Booth 405—National Metal Exposition

The remarkable machinability of our New E-Z-Cut leaded plate steel will be demonstrated at the October National Metal Exposition in Cleveland. Don't miss it!

Flame cutting also demonstrated—Watch the actual burning of intricate steel shapes with electric eye equipment.

RYERSON STEEL

In stock: Carbon, alloy and stainless steel . . . bars, structurals, plates, sheets, tubing, reinforcing bars, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age SUMMARY . . .

Consumers reappraising inventory position . . . Return of automotive portends tighter market . . . Sheet demand moving up . . . Premium prices paid for plates.

Another Look . . . Steel consumers were making an agonizing reappraisal of their inventory position this week. Some users had been lulled into a false sense of security by the summer automotive letdown. But that picture is changing—and so is the outlook for fourth quarter steel supplies.

A special IRON AGE survey of sheet users indicates growing apprehension over availability in the coming months. Storm signals already are beginning to appear, even though the full impact of automotive buying is still to come. The new model changeover period is just about over for most car builders, and the production lines will be setting an increasingly fast pace in the weeks ahead.

There's no question about the market moving into a period of increasing tightness. It's just a matter of degree. Strike losses have forced the mills to cut allocations to customers accordingly. And since consumption maintained a steady pace despite the automotive slowdown, the mill cutbacks mean reductions in consumer inventories.

Bad Word . . . The term "gray market" is a swear word among most steel users and producers. And the situation may not quite reach that stage before increased supply or reduced consumption reverses the present trend. But the term is cropping up occasionally. One fabricator already has paid $360 a ton for carbon plate —some $240 a ton above the prevailing mill price.

Costly conversion deals are being made, where possible. But it's hard to find the rolling space to carry such deals through to completion. Since the mills brought melting and finishing capacities into better balance, conversion arrangements have not been as prevalent as in past shortage markets.

The news for plate and structural consumers seems to be growing worse, if that's possible. The Suez crisis has raised the question of whether heavy oil tankers should be built.

More Problems . . . Meanwhile, the big highway program will creep up on the steel market. Peak demand will not come until 1959 but the buildup will start next spring. Concrete bars are already scarce, and will be critical well into 1957. Structurals and plate will be even harder hit.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,462	2,487	2,400	2,341
Ingot Index				
(1947-1949=100)	153.0	154.5	149.4	145.7
Operating Rates				
Chicago	102.0	102.0*	94.0	97.0
Pittsburgh	100.0	98.0*	98.0	99.0
Philadelphia	102.0	105.0	106.0	98.0
Valley	98.0	97.0	96.0	99.0
West	99.0	99.0*	95.0	94.0
Detroit	102.0	104.0*	97.0	94.0
Buffalo	105.0	105.0	107.0	105.0
Cleveland	105.0	108.0*	101.0	102.0
Birmingham	96.0	96.0	94.0	96.0
S. Ohio River	86.0	86.0*	81.0	85.0
Upper Ohio R.	104.0	98.0*	102.0	100.0
St. Louis	97.0	88.0	89.0	88.0
Northeast	100.0	100.0	95.0	97.0
Aggregate	100.0	101.0*	97.5	97.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.622	5.622	5.622*	5.174
Pig Iron (Gross Ton)	$63.04	$63.04	$63.04*	$59.09
Scrap, No. 1 hvy (gross ton)	$58.17	$58.83	$57.50	$44.17
Nonferrous				
Aluminum ingot	27.10	27.10	25.90	23.20
Copper, electrolytic	40.00	40.00	40.00	43.00
Lead, St. Louis	15.80	15.80	15.80	13.00
Magnesium ingot	36.00	36.00	36.00*	29.25
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	104.875	106.00	98.75	97.00
Zinc, E. St. Louis	13.50	13.50	13.50	13.00

*Revised

How Tight in Next Quarter?

Mills booked to capacity, warehouse stocks weak, fabricator needs up as quarter begins . . . Products in shortest supply are plate, structurals, h-r sheet and bar.

◆ AS LAST QUARTER nears, there's little room for optimism in the supply outlook.

Currently mid-West mills are running about twenty turns a week and report they are booked to capacity. Warehouse stocks, while described as "comfortable" in some quarters, are actually weak. Fabricator needs are increasing as fall upturn in business activity has its impact.

Users appear to have enough cold-rolled sheet and strip for fall production needs and no more. Cold finished bar supply is in about the same status. However, plate and structurals are impossible with hot-rolled sheet and bar bad and getting worse.

Automotive suppliers are rolling at high production levels and will probably make strong demands on the market. Oil country goods are booked solid into next year with line pipe orders already extending into 1958. Auto industry requirements are boosting demand for wire and lengthening delivery schedules.

Lone Star Steel Co. announced new prices effective Sept. 19. The company's basic pig iron price is $58.50 per gross ton and foundry pig iron is $59.00. Both products have phos content of 0.51 to 0.75 pct. Basic and foundry grades with phos content of 0.31 to 0.50 pct are $1 higher. Lone Star's new foundry coke price is $25.50 per net ton. Other company price raises are cast iron pressure pipe, up $6 to $8 per ton depending on size; line pipe, $11.50 per ton; casing, approximately $13.75 per ton, and steel plate, about $7 per ton.

Lone Star resumed production Sept. 19 after signing a new three-year labor contract which brought an end to a strike of two weeks' duration.

SHEET AND STRIP . . . Although some sheet tonnage was open a week or so in **Cleveland** when auto company orders failed to take up all the rolling time set aside for them, the year is just about filled out for all practical purposes. No local mills are accepting orders for January yet—although books may be opened during first week or so in October. Deliveries of 5-6 weeks are being quoted on cold-rolled strip despite absence of heavy orders from auto plants and their suppliers. These orders are expected to materialize in a few weeks.

A **Pittsburgh** producer reports flat rolled capacity is booked solidly through the fourth quarter. Mills there are making some allowance for entry of automotive buyers who haven't come in yet for their big tonnages. They expect flat rolled products to tighten in December with capacity operations indicated through the first quarter of next year.

At **Chicago**, mills are as good as sold out of sheets through the rest of the year. Automotive tonnage and strong demand from appliance manufacturers are the principal reasons. Some mills plan capacity operations on cold-rolled products through the first quarter just on basis of business already booked.

West Coast warehouses report shortages showing up in some sizes of cold-rolled and galvanized sheets.

BARS . . . While big automotive orders are yet to be felt in **Pittsburgh** area, one large producer reports it has not held out any space for them. It's fully committed through December. Mill reports any additional offerings of hot-rolled carbon bars are quickly taken up, but it has not felt any special pressure for bars over balance of the year. Cold finishers at **Chicago** are worried about the hot-rolled bar supply, which is not good. They see strong demand as a result of automotive activity, but don't know how they can handle it if more hot-rolled bar doesn't come from the mills. In **West Coast** area, highway, dam, and construction projects are creating a very tight market for reinforcing bars and structurals.

ALLOY AND STAINLESS . . . **Pittsburgh** producer mentions a slight easing in demand for straight chrome stainless and is actively looking for fourth quarter business. However, demand for chrome nickel grades is as strong as ever with warehouses taking all the plate they can get.

Alloy business at **Cleveland** has picked up to the extent that some facilities being used to turn out carbon bars are being cut back to turn out alloy steel. Stainless is still limited by the amount of nickel allocated with no major change in sight.

STEEL RAIL EXPORTS . . . New government regulations will limit exports of used steel rails during the fourth quarter because of shortage in this country. Limits for period ending Dec. 31 are: 6000 tons of rerolling rails, 4000 tons of relaying rails and 1500 tons of used rails. Licenses to export rails of all types through the first three quarters of 1956 totaled 72,000 tons as compared with shipments of 20,000 tons during 1955.

WAREHOUSES . . . Hot-rolled sheet at **Chicago** is beginning to get as scarce as plate and structurals. Firms in the area are also scouting cold-rolled sheet for November and December. Cold finished bar supplies are satisfactory, but hot rolled is very tight. Inventories at a **Pittsburgh** warehouse remain low and unbalanced. Everything is tight except sheets.

Purchasing Agent's Checklist

SPECIAL REPORT: Cleveland metalworking sets fast pace . . . . p. 163

MARKETS: Canmakers preserve healthy sales level . . . . . p. 169

PRODUCTION: Sheet supply may be too short to cover schedules p. 171

MANUFACTURING: Steel's expansion plans have millbuilders loaded with big order backlogs . . . p. 172

SPECIAL FEATURE: How to get more for your inspection dollar . . p. 209

Comparison of Prices

(Effective Sept. 25, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Sept. 25 1956	Sept. 18 1956	Aug. 28 1956	Sept. 20 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675*	4.325
Cold-rolled strip	6.870	6.870	6.870	6.29
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	47.50	47.50	47.50	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.85	$9.85	$9.85	$9.05
Tinplates, electro (0.50 lb.)	8.55	8.55	8.55	7.75
Special coated mfg. ternes	9.10	9.10	9.10	7.85
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	40.75	40.75	40.75	38.25
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.25¢
Rails: (per 100 lb.)				
Heavy rails	$5.075	$5.075	$5.075	$4.725
Light rails	6.00	6.00	6.00	5.65
Semifinish Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.225	4.225	4.225	4.225
Finished Steel Composite: (per pound)				
Base price	5.622¢	5.622¢	5.622¢*	5.174¢

	Sept. 25 1956	Sept. 18 1956	Aug. 28 1956	Sept. 20 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$67.76	$67.76	$67.76	$63.69
Foundry, Valley	63.00	63.00	63.00	59.00
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	63.00	63.00	63.00	59.00
Basic del'd Philadelphia	66.84	66.84	66.84	62.77
Basic, Valley furnace	62.50	62.50	62.50	58.50
Malleable, Chicago	63.00	63.00	63.00	59.00
Malleable, Valley	63.00	63.00	63.00	59.00
Ferromanganese, cents per lb‡	10¾-11¾¢	11.75¢	10.75¢	9.50¢
74 to 76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$63.04	$63.04	$63.04*	$59.09
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$58.00*	$58.50	$57.50	$44.50
No. 1 steel, Phila. area	*58.00*	58.50	57.50	46.50
No. 1 steel, Chicago	*58.50*	59.50	57.50	41.50
No. 1 bundles, Detroit	56.50	56.50	54.50	39.00
Low phos., Youngstown	66.50	66.50	65.50	47.50
No. 1 mach'y cast, Pittsburgh	60.50	60.50	60.50	46.50
No. 1 mach'y cast, Philadel'a	*58.00*	58.00	57.50	47.50
No. 1 mach'y cast, Chicago	*59.50*	60.00	59.50	52.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$58.17*	$58.83	$57.50	$44.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50	$14.50	$14.50	$13.25
Foundry coke, prompt	$17-18	$17-18	17.50	16.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	40.00	40.00	40.00	43.00
Copper, Lake, Conn.	40.00	40.00	40.00	43.00
Tin, Straits, New York	*104.875*†	106.00	98.75	97.00
Zinc, East St. Louis	13.50	13.50	13.50	13.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Aluminum, virgin ingot	27.10	27.10	25.90	23.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	36.00	36.00	36.00*	29.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	64.50	65.00	65.50	66.00	.....
Birdsboro, Pa. *B6*	64.50	65.00	65.50	66.00	.....
Birmingham *R3*	58.50	59.00*	.....	.....	.....
Birmingham *W9*	58.50	59.00*	63.00	.....	.....
Birmingham *U4*	58.50	59.00*	63.00	.....	.....
Buffalo *R3*	62.50	63.00	63.50	64.00	.....
Buffalo *H1*	62.50	63.00	63.50	.....	.....
Buffalo *W6*	62.50	63.00	63.50	64.00	.....
Chester *P2*	64.50	65.00	65.50	.....	.....
Chicago *I4*	62.50	63.00	63.00	63.50	.....
Cleveland *A5*	62.50	63.00	63.00	63.50	67.50†
Cleveland *R3*	62.50	63.00	63.00	63.50	.....
Duluth *I4*	62.50	63.00	63.00	63.50	67.50†
Erie *I4*	62.50	63.00	63.00	63.50	67.50†
Everett *M6*	.....	63.75	64.25	.....	.....
Fontana *K1*	70.00	70.50	.....	.....	.....
Geneva, Utah *C7*	62.50	63.00	.....	.....	.....
Granite City *G2*	64.40	64.90	65.40	.....	.....
Hubbard *Y1*	.....	.....	63.00	.....	.....
Lone Star *L3*	58.50	59.00	.....	.....	.....
Midland *C11*	62.50	.....	.....	.....	.....
Minnequa *C6*	64.50	65.00	65.50	.....	.....
Monessen *P6*	62.50	.....	.....	.....	.....
Neville Is. *P4*	62.50	63.00	63.00	63.50	67.50†
N. Tonawanda *T1*	.....	63.00	63.50	64.00	.....
Pittsburgh *U1*	62.50	.....	63.00	63.50	.....
Sharpsville *S3*	62.50	63.00	63.00	63.50	.....
So. Chicago *R3*	62.50	63.00	63.00	.....	.....
Steelton *B3*	64.50	65.00	65.50	66.00	70.50
Swedeland *A2*	64.50	65.00	65.50	65.50	.....
Toledo *I4*	62.50	63.00	63.00	63.50	.....
Troy, N. Y. *R3*	64.50	65.00	65.50	66.00	.....
Youngstown *Y1*	.....	.....	63.00	63.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31-0.69 pct phos. † Intermediate low phos.

Silvery Iron: Buffalo, *H1*, $72.50; Jackson, *J1*, *I4* (Globe Div.), $71.50; Niagara Falls (15.01-15.50), $99.50; Keokuk (14.01-14.50), $102.00; (15.51-16.00), $105.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 14 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon: $64.00.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

←To identify producers, see Key on p. 318→

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	19.75	21.00	20.50	22.00	—	23.25	35.25	28.25	32.75	—	16.00	27.75	16.25
Slabs, billets	24.50	27.25	25.25	28.00	28.50	29.25	44.50	35.75	42.00	—	20.75	—	21.00
Billets, forging	—	33.00	33.75	34.00	37.00	36.00	56.25	42.25	50.25	30.75	27.25	27.75	27.75
Bars, struct.	39.00	39.25	40.50	40.75	43.75	43.00	66.75	50.25	59.00	36.25	32.50	33.00	33.00
Plates	—	41.25	42.50	43.00	45.50	45.75	70.25	54.50	63.75	38.75	33.75	35.50	34.50
Sheets	45.00	45.25	47.25	47.50	55.75	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Strip, hot-rolled	33.00	35.75	34.00	36.75	—	39.75	63.50	48.75	58.25	—	29.75	—	30.75
Strip, cold-rolled	41.50	45.25	43.75	47.50	52.00	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	37.25	38.50	38.75	41.75	41.00	63.75	48.00	56.25	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2, J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa', *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O.. *R3*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1* (.25 per lb higher); New Bedford, Mass., *R6*; Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa. *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; S. Chicago, *U1*; Syracuse, N. Y. *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*; Gary, *U1*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*, Dunkirk, *A3* (.25¢ per lb lower on Types 301, 303 and 316); Monessen, *P1*; Syracuse, *C11* (.25¢ per lb lower on Type 301, 304, and 304); Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3* Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*.

Market Finally Passes Peak

Composite makes first decline since June . . . Purchases result in slight break in market in major areas . . . Export is still strong, but other general weakening is observed.

◆ THE MARKET ENDED its two-month climb into record price levels when mill purchases in all major market areas brought price declines.

But the market gave in only slightly as sales at continued record high prices offset the depressing effect of purchases by a major consumer. In Pittsburgh and Philadelphia, the effect was a widening of the market spread, to reflect the new purchase and continued business at levels that did not yield.

In Philadelphia and Pittsburgh, some brokers refused to bid on the new order, primarily because they are already paying higher prices to cover old orders. In Chicago, several mills bought at slightly lower prices, but there too resistance was encountered.

The market continued strong, despite the lower prices in major markets, and a real break is not likely, even though mill resistance to continued record prices is beginning to tell.

THE IRON AGE Composite price dropped to $58.17 from last week's all time high of $58.83. It was the first decline to be recorded since June 13. However, the two-month price rise did not begin until July 19. After a sudden upsurge, the market climbed steadily from $44.83 Composite July 12 to last week's record.

Export continues to be a major factor on all coasts, including the Gulf. On the Pacific Coast, Japan demand is becoming a real trouble-maker to coast mills. Prices for most steelmaking grades advanced on the strength of export.

Another factor in the slight easing of the market is the prospect of renewed auto production. October auto lists are expected to be 50 pct higher in tonnage than September.

Pittsburgh . . . A new mill purchase of openhearth scrap by a local mill has caused a split in the price of No. 1 heavy melting. Mill prices were $57 for No. 1, $51 for No. 2 heavy melting, and $48 for No. 2 bundles. Tonnage was around 20,000 tons with No. 2 grades making up an unusually large portion. At least one broker declined to take any of the No. 1 tonnage. At the same time, dealers are being paid as much as $60 for shipment out of the district and are resisting local prices. This has resulted in a $2 spread in the price of No. 1 heavy melting.

Chicago . . . Responding to reports of weakening eastern markets, as well as purchases by at least three mills at reduced prices, the Chicago market slid off slightly last week. Orders that had been refused in the early part of the week were being snapped up by week's end. Brokers were having some difficulty at covering price, however. For instance, a $59 order of No. 1 heavy melting, not regarded as a good sale early in the week, was being covered later. The slight slip extended through most of the list.

Philadelphia . . . The spread on No. 1 heavy melting widened to $57-$59, reflecting strong mill resistance to current price levels. A mill purchase at $57 for openhearth grades was offset by other purchases at higher prices. Heavy export activity is shoring up this market, making it doubtful that the widening spread will develop into a genuine price break. Possibility of a longshoremen's strike might change the picture, especially if mill resistance remains high.

New York . . . The market was unchanged here despite a purchase in an adjacent area at prices somewhat under the previous level. Export continued strong, keeping price levels firm, despite attempts to push the market off its record peak.

Detroit . . . Auto lists began closing this week and the trade generally expects a decline of from $1 to $3. Prime reason for the expected decline is the increase in amount of auto scrap generated. Best estimates are that there will be as least 50 pct more scrap available in October than this month because of the start of new model production.

Cleveland . . . No. 2 heavy melting dropped $1 and No. 2 bundles went up $1 in the Valley on the basis of purchases by a large consumer. Prices are now $50 and $47, respectively. Some weakness of secondary grades is noticed and a slight dip in the auto lists closing this week is expected.

Birmingham . . . Although the openhearth market is dull, with a major consumer still holding up shipments, the specialties market is very strong, sending prices upwards. Exporters continue to scramble for scrap.

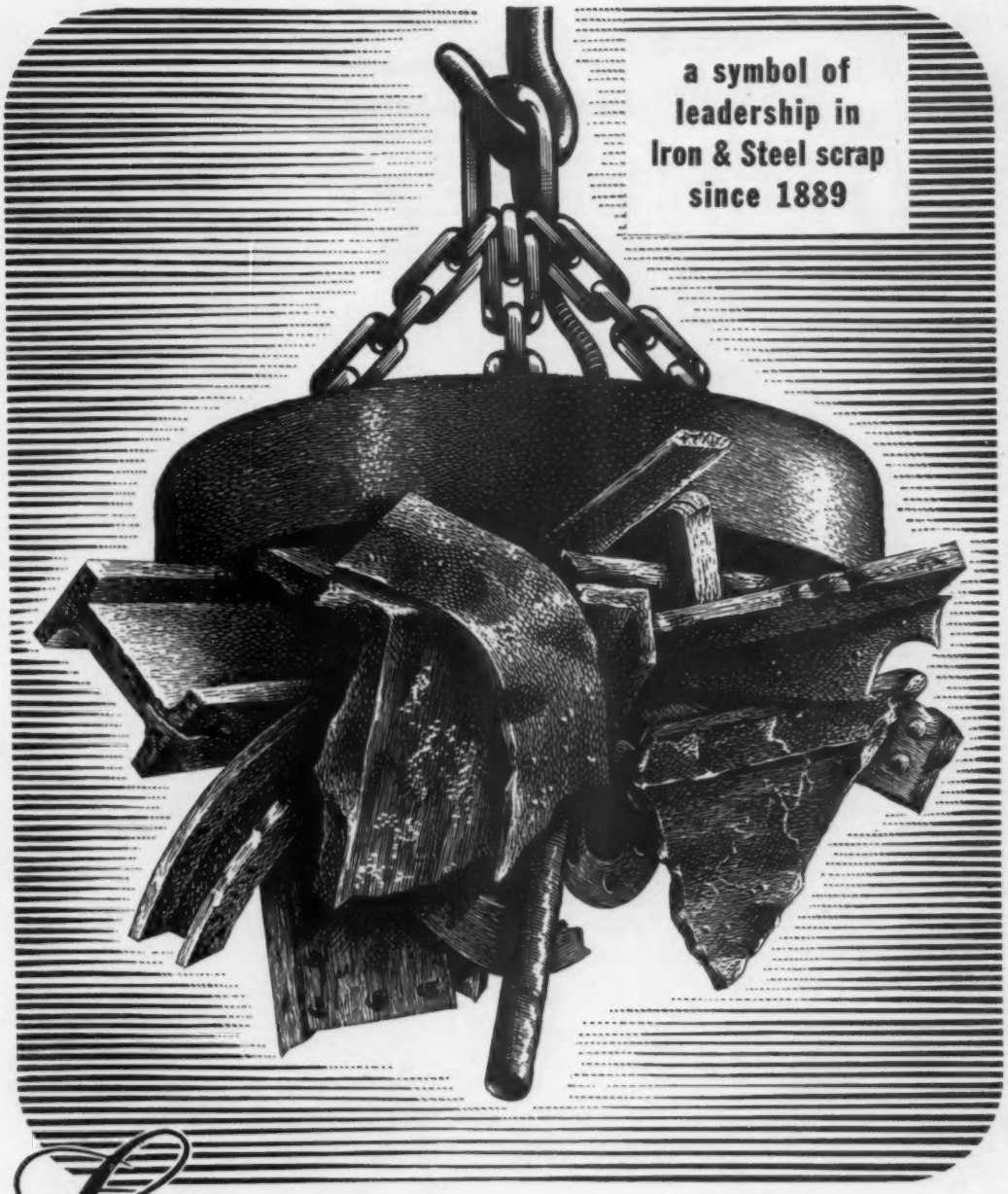
St. Louis . . . With consumers long on supply of borings and turnings, prices have dropped $2. The market continues strong generally, however, with enough scrap coming in to strengthen inventories in advance of winter curtailment.

Cincinnati . . . Secondary grades are slightly weaker here and area production lists are also expected to drop. Some primary grades are moving up river, but the market is generally quiet with no real action.

Buffalo . . . Prices are unchanged this week. There have been no major sales and shipments to mills on their last orders are moving on schedule. Dealers report their yards are operating at 85 pct of capacity.

Boston . . . Prices of primary grades held level, but both No. 2 bundles and No. 2 heavy melting advanced. Export sales pushed No. 2 heavy melting up $.50 while a purchase of bundles from the Philadelphia area advanced that grade.

West Coast . . . Heavy exporting continues to put pressure on scrap prices. Mills are having a tough time getting a good supply. Prices advanced for most steelmaking grades here.



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Scrap Prices *(Effective Sept. 25, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$57.00 to $59.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 bundles	57.00 to 59.00
No. 2 bundles	47.00 to 48.00
Machine shop turn.	38.00 to 39.00
Mixed bor. and ms. turn.	38.00 to 39.00
Shoveling turnings	42.00 to 43.00
Cast iron borings	42.00 to 43.00
Low phos. punch'gs plate	67.00 to 68.00
Heavy turnings	54.00 to 55.00
No. 1 RR hvy. melting	67.00 to 68.00
Scrap rails, random lgth	77.00 to 78.00
Rails 2 ft and under	81.00 to 82.00
RR. steel wheels	74.00 to 75.00
RR. spring steel	74.00 to 75.00
RR. couplers and knuckles	74.00 to 75.00
No. 1 machinery cast.	60.00 to 61.00
Cupola cast.	53.00 to 54.00
Heavy breakable cast.	51.00 to 52.00

Chicago

No. 1 hvy. melting	$58.00 to $59.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 factory bundles	65.00 to 66.00
No. 1 dealers' bundles	58.00 to 59.00
No. 2 dealers' bundles	44.00 to 45.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and turn.	38.00 to 39.00
Shoveling turnings	38.00 to 39.00
Cast iron borings	38.00 to 39.00
Low phos. forge crops	72.00 to 73.00
Low phos. punch'gs plate	69.00 to 70.00
Low phos. 3 ft and under	67.00 to 68.00
No. 1 RR. hvy. melting	65.00 to 66.00
Scrap rails, random lgth	75.00 to 76.00
Rerolling rails	86.00 to 87.00
Rails 2 ft and under	84.00 to 85.00
Locomotive tires, cut	70.00 to 71.00
Cut bolsters & side frames	70.00 to 71.00
Angles and splice bars	75.00 to 76.00
RR. steel car axles	89.00 to 90.00
RR. couplers and knuckles	69.00 to 70.00
No. 1 machine cast.	59.00 to 60.00
Cupola cast.	54.00 to 55.00
Heavy breakable cast.	48.00 to 49.00
Cast iron brake shoe	49.00 to 50.00
Cast iron wheel	59.00 to 60.00
Malleable	71.00 to 72.00
Stove plate	50.00 to 51.00
Steel car wheels	70.00 to 72.00

Philadelphia Area

No. 1 hvy. melting	$57.00 to $59.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 bundles	57.00 to 59.00
No. 2 bundles	46.00 to 47.00
Machine shop turn.	40.00 to 41.00
Mixed bor. short turn.	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Shoveling turnings	44.00 to 45.00
Clean cast chem. borings	46.00 to 47.00
Low phos. 5 ft and under	61.00 to 62.00
Low phos. 2 ft and under	62.00 to 63.00
Low phos. punch'gs	62.00 to 63.00
Elec. furnace bundles	60.00 to 61.00
Heavy turnings	54.00 to 55.00
RR. steel wheels	69.00 to 70.00
RR. spring steel	69.00 to 70.00
Rails 18 in. and under	76.00 to 77.00
Cupola cast.	53.00 to 54.00
Heavy breakable cast.	56.00 to 57.00
Cast iron car wheels	64.00 to 65.00
Malleable	68.00 to 69.00
Unstripped motor blocks	44.00 to 45.00
No. 1 machinery cast.	57.00 to 59.00

Cleveland

No. 1 hvy. melting	$62.00 to $63.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 bundles	62.00 to 63.00
No. 2 bundles	40.00 to 41.00
No. 1 busheling	62.00 to 63.00
Machine shop turn.	33.00 to 34.00
Mixed bor. and turn.	38.50 to 39.50
Shoveling turnings	38.50 to 39.50
Cast iron borings	38.50 to 39.50
Cut struct'r'l & plates, 2 ft & under	66.00 to 67.00
Drop forge flashings	62.00 to 63.00
Low phos. punch'gs, plate	63.00 to 64.00
Foundry steel, 2 ft & under	56.00 to 57.00
No. 1 RR. heavy melting	66.00 to 67.00
Rails 2 ft and under	83.00 to 84.00
Rails 18 in. and under	84.00 to 85.00
Railroad grate bars	47.00 to 48.00
Steel axle turnings	44.00 to 45.00
Railroad cast.	60.00 to 61.00
No. 1 machinery cast.	57.00 to 58.00
Stove plate	54.00 to 55.00
Malleable	70.00 to 71.00

Youngstown

No. 1 hvy. melting	$65.00 to $66.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 bundles	65.00 to 66.00
No. 2 bundles	45.00 to 47.00
Machine shop turn.	34.00 to 35.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Low phos. plate	66.00 to 67.00

Buffalo

No. 1 hvy melting	$54.00 to $55.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 busheling	54.00 to 55.00
No. 1 bundles	54.00 to 55.00
No. 2 bundles	42.00 to 43.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	32.00 to 33.00
Low phos. plate	59.00 to 60.00
Scrap rails, random lgth	57.00 to 58.00
Rails 2 ft and under	77.00 to 78.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	70.00 to 71.00
No. 1 machinery cast.	52.00 to 53.00
No. 1 cupola cast.	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$55.00 to $56.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 bundles, openhearth	56.00 to 57.00
No. 2 bundles	37.00 to 38.00
New busheling	55.00 to 56.00
Drop forge flashings	54.50 to 55.50
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Low phos. punch'gs, plate	55.00 to 56.00
No. 1 cupola cast.	51.00 to 52.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	45.00 to 46.00
Automotive cast.	54.00 to 55.00

St. Louis

No. 1 hvy. melting	$52.00 to $53.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 bundles	55.00 to 56.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	34.00 to 35.00
Cast iron borings	35.00 to 36.00
Shoveling turnings	35.00 to 36.00
No. 1 RR. hvy. melting	62.50 to 63.50
Rails, random lengths	75.00 to 76.00
Rails 18 in. and under	79.00 to 80.00
Locomotive tires uncut	65.00 to 66.00
Angles and splice bars	68.00 to 69.00
Std. steel car axles	80.00 to 81.00
RR. specialties	68.00 to 69.00
Cupola cast.	54.00 to 55.00
Heavy breakable cast.	44.00 to 45.00
Cast iron brake shoes	50.00 to 51.00
Stove plate	47.00 to 48.00
Cast iron car wheels	53.00 to 54.00
Rerolling rails	87.00 to 88.00
Unstripped motor blocks	44.00 to 45.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$50.50 to $51.50
No. 2 hvy. melting	39.50 to 40.50
No. 1 bundles	50.50 to 51.50
No. 2 bundles	37.00 to 38.00
No. 1 busheling	49.50 to 50.50
Elec. furnace, 3 ft & under	53.00 to 54.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and short turn	31.00 to 32.00
Shoveling turnings	34.00 to 34.50
Clean cast chem. borings	34.00 to 35.00
No. 1 machinery cast.	45.00 to 46.00
Mixed cupola cast.	42.00 to 43.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	39.00 to 40.00
Unstripped motor blocks	32.00 to 33.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	44.00 to 45.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	37.00 to 38.00
Clean cast chem. borings	35.00 to 36.00
No. 1 machinery cast.	52.00 to 53.00
Mixed yard cast.	48.00 to 49.00
Charging box cast.	48.00 to 49.00
Heavy breakable cast.	48.00 to 49.00
Unstripped motor blocks	38.00 to 39.00

Birmingham

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	42.00 to 43.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	33.00 to 34.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	30.50 to 31.50
Electric furnace bundles	53.00 to 54.00
Bar crops and plate	59.00 to 60.00
Structural and plate, 2 ft	57.00 to 58.00
No. 1 RR. hvy. melting	50.00 to 51.00
Scrap rails, random lgth	69.00 to 70.00
Rails, 18 in. and under	74.00 to 75.00
Angles & splice bars	68.00 to 69.00
Rerolling rails	77.00 to 78.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	51.00 to 52.00
Charging box cast.	40.00 to 41.00
Cast iron car wheels	45.00 to 46.00
Unstripped motor blocks	45.00 to 46.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 bundles	57.00 to 58.00
No. 2 bundles	42.00 to 43.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and turn.	39.00 to 40.00
Shoveling turnings	39.00 to 40.00
Cast iron borings	39.00 to 40.00
Low phos. 18 in. & under	62.00 to 63.00
Rails, random lengths	69.00 to 70.00
Rails, 18 in. and under	77.00 to 78.00
No. 1 cupola cast.	48.00 to 49.00
Hvy. breakable cast.	47.00 to 48.00
Drop broken cast.	58.00 to 59.00

San Francisco

No. 1 hvy. melting	$52.00
No. 2 hvy. melting	48.00
No. 1 bundles	48.00
No. 2 bundles	43.00
No. 3 bundles	29.00
Machine shop turn.	30.00
Cast iron borings	30.00
No. 1 RR. hvy. melting	52.00
No. 1 cupola cast.	55.00

Los Angeles

No. 1 hvy. melting	$52.00
No. 2 hvy. melting	48.00
No. 1 bundles	48.00
No. 2 bundles	40.00
No. 3 bundles	30.00
Machine shop turn.	30.00
Shoveling turnings	33.00
Cast iron borings	30.00
Elec. furn. 1 ft and under	54.00
No. 1 RR. hvy. melting	52.00
No. 1 cupola cast.	55.00

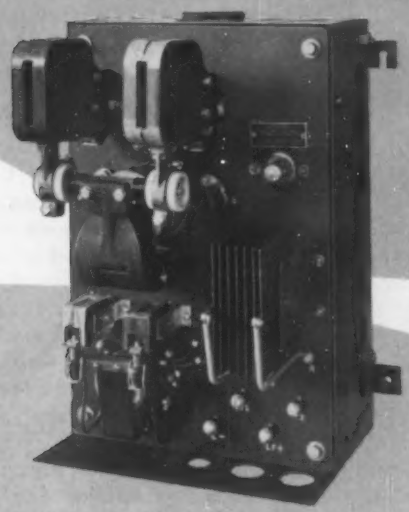
Seattle

No. 1 hvy. melting	$52.00
No. 2 hvy. melting	48.00
No. 2 bundles	31.00
No. 3 bundles	27.00
No. 1 cupola cast.	50.00
Mixed yard cast.	50.00

Hamilton, Ont.

No. 1 hvy. melting	$52.00
No. 2 hvy. melting	47.00
No. 1 bundles	52.00
No. 2 bundles	42.50
Mixed steel scrap	46.00
Bushelings	39.50
Bush., new fact., prep'd	50.00
Bush., new fact., unprep'd	46.00
Machine shop turn.	28.00
Short steel turn.	34.00
Mixed bor. and turn.	28.00
Rails, rerolling	60.00
Cast scrap	50.00

Ohio RD2 Controller (case not shown)



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OHIO MAGNET CONTROLLERS

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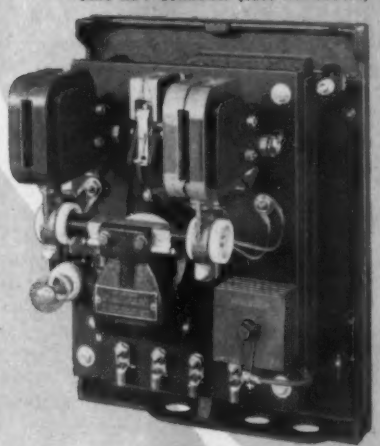

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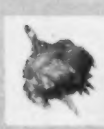

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NONFERROUS MARKETS

Prices Ride Political Winds

Rising tin prices, showing concern over getting supply via Suez, are case in point . . . Political, physical and economic shifts could affect copper, lead and zinc.

◆ THE SPIRALING tin price is an illustration of the international implications involved in most nonferrous metal markets.

It is becoming difficult to make a prediction on the state or condition of a market for any more than six months ahead. With the added importance of world events outside the U. S., a consumer might as well throw away the charts, graphs, and reports which have constituted his form sheet in the past.

There is plenty of tin being mined and refined to go around. In fact if it were not for government buying there would be a surplus. And yet the current price is around $1.05 per lb, up from 5¢ to 10¢ higher than normal. Although there is plenty of tin around, two of the world's largest producers, accounting for more than 50 pct, are Malaya and Indonesia. Metal must normally go through the Suez Canal to arrive at their major market in U. S. or London. When Egypt seized the canal the price skyrocketed. Currently its daily fluctuation is based primarily on the progress being made at the conferences called to decide on future action with regard to the canal.

None of the other major metals is basically affected by the canal controversy, but all have their own problems.

Consumers of copper, zinc, lead, and nickel all depend on imports for the pivotal supply, the amount of which determines the condition of the market. Political, physical, and economic shifts in Chile, Africa, and London could change copper supply, demand, balance, or price.

There are no less than four countries including Australia, Mexico, and Germany, which normally produce in excess of 100,000 tons of lead annually. Trouble in any of these, or along the trade routes would affect world supply and price structure.

About 40 pct of this country's supply of zinc is imported. There are seven countries at least who are normally in a position to supply the needed metal, of which a number are known for political instability. Zinc production today is more than adequate. But then so is tin production.

Nickel is still in such tight supply that it couldn't stand much pressure before becoming critical. Fortunately most of this metal comes from Canada. However, there is enough coming from France and Japan to cause some anxiety.

Aluminum seems to be in an enviable position since the vast bulk of the metal is domestically or Canadian produced. However it can not be considered completely out of the reach of international occurrences since the best bauxite comes from the Caribbean.

What's the answer? Consumers of nonferrous metals can no longer be merely specialists in their particular operation. The front page of the newspaper must now be read with the same intensity as the financial and business section.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Sept. 19	Sept. 20	Sept. 21	Sept. 22	Sept. 24	Sept. 25
Copper, electro, Conn.	40.00	40.00	40.00	40.00	40.00	40.00
Copper, Lake, delivered	40.00	40.00	40.00	40.00	40.00	40.00
Tin, Straits, New York	106.00	105.00	105.375	....	104.875	104.875*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

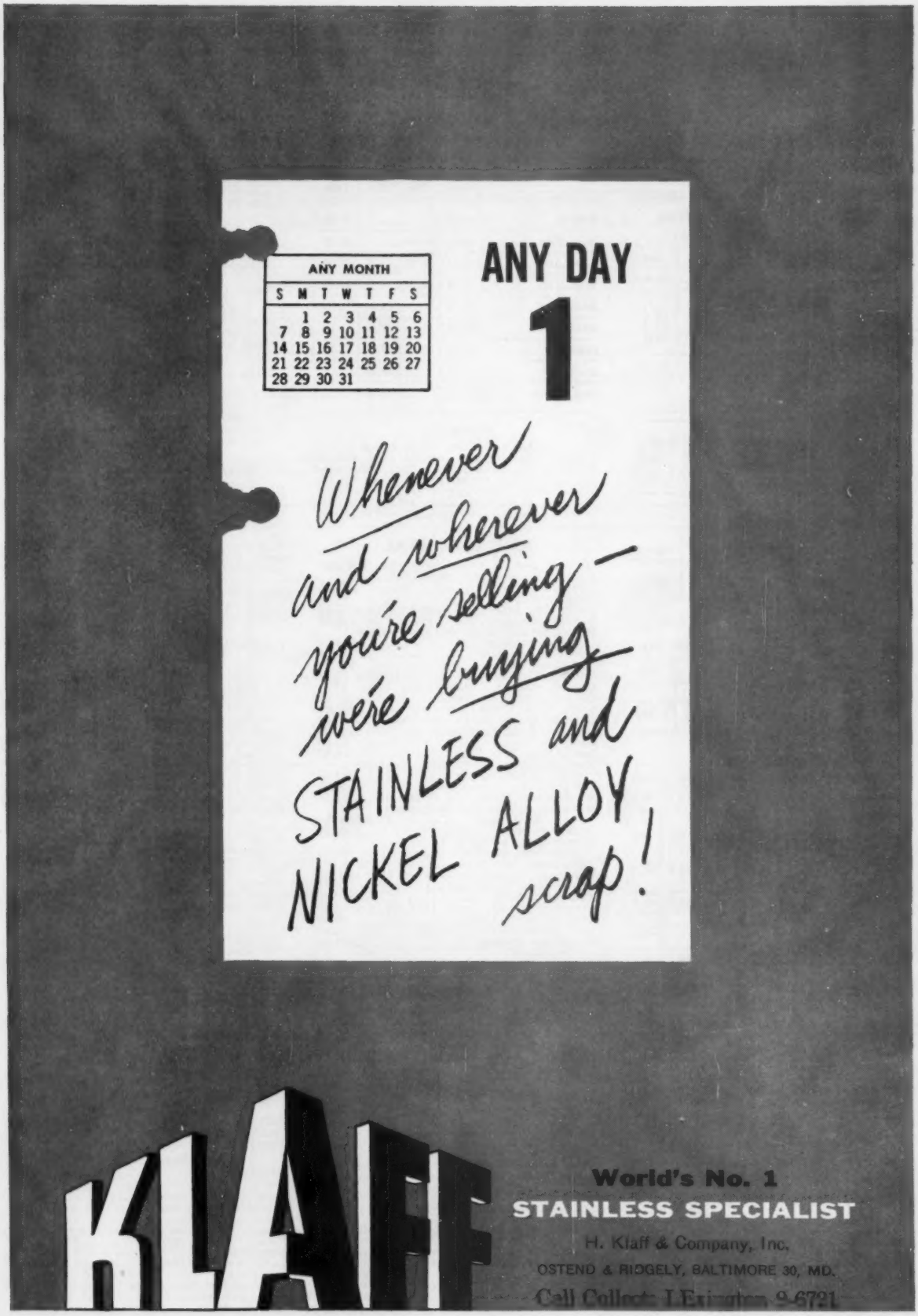
Note: Quotations are going prices. **Tentative*

ALUMINUM . . . Primary aluminum production in the U. S. dropped to 184,812,424 lb during August because of the industry strike, reports the Aluminum Assn. Total production for the year through August is 2,208,668,213 lb. This is above production for the same period of 1955 when the total was 2,052,151,837. The month of July, 1956 established a new all-time record monthly production of 303,248,010 lb.

Despite the strike in August, shipments of aluminum products this year will exceed those of '55, members of the Prime Aluminum Products Industry Advisory Committee recently stated. At a meeting to discuss the supply-demand picture, they told Business and Defense Services Administration officials that fourth quarter shipments will exceed 1 billion lb. This will reflect a rise as third quarter shipments will fall below the 1.078 billion lb shipped in the second quarter.

COPPER . . . Government this week (Sept. 24) closed the expansion goal it set in 1952 for expansion of the copper supply. Goal called for annual supply of 2,270,000 tons of copper to be available to mobilization demands. Office of Defense Mobilization agreed with U. S. Dept. of the Interior that this figure has been reached and passed. Therefore the goal was closed. The 2,270,000 ton figure is based on supplies made available from domestic production, old scrap, and imports.

LEAD . . . General Services Administration entered the market as a buyer for the long-term stockpile. Specifications were that metal must be of domestic origin, tenders must be in by Sept. 25, and metal must be delivered by Nov. 15.


ANY MONTH
S M T W T F S
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7 8 9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
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Nonferrous Prices *(Effective Sept. 25, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.126-.249	.250-S.
1100,1100, 3003	44.3	42.1	40.9	40.3
5052	51.3	46.3	45.1	43.9
6061-0	48.9	44.6	42.8	43.0

Extruded Solid Shapes

Factor	6063 T-5	6063 T-6
6- 8	45.5-47.3	61.3-65.1
12-14	46.2-47.7	62.3-66.3
24-26	49.4-49.5	73.1-77.5
36-38	58.3-59.9	97.4-101.9

Screw Machine Stock—2011-T-3

Size*	¼	⅜-½	⅝-1	1⅛-1¼
Price	59.7	58.3	57.4	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(f.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250-3.00	.350-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.3
Spec. Grade (AZ31B)	84.6	85.7	90.6	106.3

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	113	97	118
Strip, CR	111	99	128
Rod, Bar, HR	94	80	99
Angles, HR	94	80	99
Plate, HR	107	96	111
Seamless tube	144	120	190
Shot, blocks	...	78	...

COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	61.63	.....	.....	61.83
Brass, 70/30	52.10	52.64	.....	55.01
Brass, Low	55.85	56.39	55.75	58.66
Brass, R L	57.19	57.73	57.13	60.00
Brass, Naval	55.72	.....	50.03	58.88
Muntz Metal	53.84	47.85	49.65	.....
Comm. Bz.	59.08	59.62	59.02	61.64
Manf. Bz.	59.46	.....	53.56	.....
Phos. Bz. 5%	79.56	.....	80.08	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $12.10-$12.60; alloy, $15.00-$15.75; Plate, HR, commercially pure, $10.00-$10.50; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.00-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.55-$7.80; alloy, $7.55-$7.75.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight allowed 27.10
Aluminum pig 25.00
Antimony, American, Laredo, Tex. 33.50
Beryllium copper, per lb conta'd Be $43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be $74.75
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Cobalt, 97-99% (per lb) ... $2.60 to $2.67
Copper, electro, Conn. Valley 40.00
Copper, Lake, delivered 40.00
Gold, U. S. Treas., per troy oz. ... $35.00
Indium, 99.9% dollars per troy oz. $ 2.25
Iridium, dollars per troy oz. ... $90 to $100
Lead, St. Louis 15.80
Lead, New York 16.00
Magnesium, 99.8+%, f.o.b. Velasco, Tex., 10,000 lb, pig 35.25
ingot 36.00
Magnesium, sticks, 100 to 500 lb. ... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $255 to $257
Nickel electro 64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz. .. $23 to $24
Platinum, dollars per troy oz. $103 to $105
Silver, New York, cents per troy oz. 90.75
Tin, New York 104.875
Titanium sponge, grade A-1, $2.70 to $3.00
Zinc, East St. Louis 13.50
Zinc, New York 14.00
Zirconium sponge $10.00
*Tentative.

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 37.75
No. 120 ..... 36.50
No. 123 ..... 35.00
80-10-10 ingot
No. 305 ..... 41.00
No. 315 ..... 39.25
88-10-2 ingot
No. 210 ..... 52.75
No. 215 ..... 48.50
No. 245 ..... 43.50
Yellow ingot
No. 405 ..... 29.75
Manganese bronze
No. 421 ..... 33.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 28.25-29.00
0.60 copper max. 28.00-28.75
Piston alloys (No. 122 type) .. 27.75-28.50
No. 12 alum. (No. 2 grade) ... 26.25-27.00
108 alloy 26.50-27.00
195 alloy 27.50-28.50
13 alloy (0.60 copper max.) ... 28.00-28.75
AXS-679 ..... 26.50-27.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 26.50-27.00
Grade 2—92-95% 25.50-26.00
Grade 3—90-92% 24.50-25.00
Grade 4—85-90% 24.00-24.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	36	35¼
Yellow brass	27¼	25⅛
Red brass	31⅞	31⅛
Comm. bronze	33⅛	32⅝
Mang. bronze	25¼	24½
Yellow brass rod ends	27	....

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 33
No. 2 copper wire 31½
Light copper 29½
*Refinery brass 29½
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 32.75-33.00
No. 2 copper wire 30½
Light copper 28
No. 1 composition 30
No. 1 comp. turnings 29½
Hvy. yellow brass solids 21
Brass pipe 21¾
Radiators 23½

Aluminum

Mixed old cast. ..... 17½—18½
Mixed new clips ..... 18 —19
Mixed turnings, dry ..... 17½—18½

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire 31
No. 2 copper wire 28½
Light copper 26½
Auto radiators (unsweated) .. 19 —19½
No. 1 composition ..... 25½—26
No. 1 composition turnings .. 24 —24½
Unlined red car boxes ..... 20 —21½
Cocks and faucets ..... 19 —19½
Clean heavy yellow brass ... 17 —17½
Brass pipe ..... 20½—21
New soft brass clippings .... 22 —22½
No. 1 brass rod turnings .... 19½—20½

Aluminum

Alum. pistons and struts ... 8 — 8½
Aluminum crankcases ..... 13 —13½
1100 (2S) aluminum clippings 16 —16½
Old sheet and utensils ..... 13 —13½
Borings and turnings ..... 9 — 9½
Industrial castings ..... 13 —13½
2024 (24S) clippings ..... 14½—15

Zinc

New zinc clippings ..... 7½— 8
Old zinc ..... 4½— 5
Zinc routings ..... 2¾— 3
Old die cast scrap ..... 2½— 2¾

Nickel and Monel

Pure nickel clippings ..... $1.85-$1.95
Clean nickel turnings ..... $1.55-$1.65
Nickel anodes ..... $1.85-$1.95
Nickel rod ends ..... $1.85-$1.95
New Monel clippings 80-90
Clean Monel turnings 70-80
Old sheet Monel 70-80
Nickel silver clippings, mixed 21
Nickel silver turnings, mixed 18

Lead

Soft scrap lead ..... 12½—13
Battery plates (dry) ..... 7 — 7¼
Batteries, acid free 4¼

Miscellaneous

Block tin ..... 80 —81
No. 1 pewter ..... 62½—63
Auto babbitt ..... 42 —42½
Mixed common babbitt ..... 13 —13⅛
Solder joints ..... 18 —18½
Siphon tops 42
Small foundry type ..... 15¼—15⅓
Monotype ..... 14½—15
Lino. and stereotype ..... 13 —13⅓
Electrotype ..... 12½—12⅝
Hand picked type shells ..... 10 —10⅓
Lino. and stereo. dross ..... 5⅛— 5⅜
Electro. dross ..... 4⅛— 4⅓

IRON AGE

STEEL PRICES

(Effective Sept. 25, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	$74.00 *B3, R3*	$91.50 *B3, R3*	$107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.875 *B3, R3*	6.85 *R7*	6.95 *B3*			
	Claymont, Del.													
	Harrison, N. J.													14.55 *C11*
	Conshohocken, Pa.		$96.50 *A2*	$114.00 *A2*					4.725 *A3*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	$74.00 *B3*	$91.50 *B3*	$107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *D1*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.875 *B3*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	$79.00 *N8*	$96.50 *N8*	$107.00 *N8*						7.30 *W1* 6.95 *T8*				
	Pawtucket, R. I. Worcester, Mass.									7.40 *A5,N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.875 *L1*					
	Ashland, Ky.								4.875 *A7*					
	Canton-Massillon, Dover, Ohio		$94.00 *R3*	$107.00 *R3 T5*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill.	$74.00 *U1, R3*	$91.50 *U1, R3,W8*	$107.00 *U1, R3,W8*	5.90 *U1*	5.00 *U1, W8*	7.35 *U1, Y1* 6.00 *W8*	5.00 *U1*	4.875 *N4* 4.875 *A1*	6.95 *A1,T8*			7.75 *W8, S9*	14.55 *A1, S9,T8*
	Cleveland, Ohio									6.85 *A5,J3*			7.75 *J3*	
	Detroit, Mich.	$74.00 *R5*		$107.00 *R5*					4.775 *G3, M3*	6.95 *M2,G3, D2,P11*	7.05 *G3*	10.10 *G3, S1,D2*	7.05 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 *U1*	$91.50 *U1*	$107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1,I3*	5.00 *I3*	4.875 *U1, I3,Y1*	6.85 *Y1*	6.95 *U1, I3,Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	$74.00 *N4*							4.775 *N4*					
	Indianapolis, Ind.									7.00 *C3*				
	Newport, Ky.												7.75 *N5*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$91.50 *S1, C10*	$107.00 *S1 C10*					4.875 *S1, R3*	6.85 *T4*	6.95 *S1, R3*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 *U1, J3*	$91.50 *U1, J3, C11*	$107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.875 *P6*	5.750 *P6* 6.85 *J3,B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.875 *W3*	6.85 *W3,F3*	6.95 *W3*	9.65 *W3*		
	Youngstown, Ohio	$74.00 *R3*	$91.50 *Y1, C10*	$107.00 *Y1*		5.00 *Y1*	7.35 *Y1*		4.875 *U1, Y1*	6.85 *Y1,C3*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
WEST	Fontana, Cal.	$83.50 *K1*	$101.00 *K1*	$128.00 *K1*		5.70 *K1*	8.05 *K1*	5.55 *K1*	5.475 *K1*	8.00 *K1*	—			
	Geneva, Utah	$91.50 *C7*				5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			
	Los Angeles, Torrance, Cal.		$101.00 *B2*	$127.00 *B2*		5.70 *C7, B2*	8.05 *B2*		5.425 *B2, C7*	8.00 *C1*			8.95 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.175 *C8*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 *B2*			5.65 *B2*	8.00 *B2*		5.425 *C7, B2*					
	Seattle, Wash.		$105.00 *B2*			5.75 *B2*	8.10 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.								4.875 *A9*					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 *T2*	$91.50 *T2*			5.00 *T2, R3* 5.50 *C16*	7.35 *T2*		4.875 *T2, R3* 4.975 *C16*		6.95 *T2*			
	Houston, Lone Star, Texas		$96.50 *S2*	$112.00 *S2*		5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			

IRON AGE

STEEL PRICES

(Effective Sept. 25, 1956)

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		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Coke* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*			5.80 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*				$9.70 *U1*	$8.40 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*		5.90 *B3*	$9.70 *B3*		
	Worcester, Mass.										6.10 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*									
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*	6.325 *R3*									
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*	5.80 *A5,R3, N4,W8,K2*			
	Sterling, Ill.										5.90 *N4,K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*			5.80 *A5*			
	Detroit, Mich.	4.775 *G3,* M1	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*						
	Newport, Ky.	4.675 *N5*	5.75 *N5*											
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*			5.80 *Y1*	$9.60 *U1, Y1*	$8.30 *I3, U1,Y1*	7.15 *U1, Y1*
	Granite City, Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*								$8.40 *G2*	7.25 *G2*
	Kokomo, Ind.			6.40 *C9*							5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*								
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3, N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*					8.30 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*		5.80 *A5, P6,J3*	$9.60 *J3, U1*	$8.30 *U1*	7.15 *U1*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*								5.80 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*				$9.60 *W5*	$8.30 *W5*	7.15 *W3* 7.40 *W3*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*			5.80 *Y1*			7.15 *Y1*
WEST	Fontana, Cal.	5.475 *K1*	6.95 *K1*				7.70 *K1*	9.725 *K1*				$10.35 *K1*	$9.05 *K1*	
	Geneva, Utah	4.775 *C7*												
	Kansas City, Mo.										6.05 *S2*			
	Los Angeles, Torrance, Cal.										6.60 *B2*			
	Minnequa, Colo.										6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*							6.45 *C7*	$10.35 *C7*	$9.05 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	5.75 *T2*	6.30 *T2, R3*							5.80 *T2,R3*	$9.70 *T2*	$8.40 *T2*	
	Houston, Tex.										6.05 *S2*			

IRON AGE

STEEL PRICES

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.35 *C4*		6.85 *C4*	7.55 *C4*	
	Coatesville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.90 *A2*	5.925 *A2*	6.25 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.00 *P2*	6.275 *C3*			
	Hartford, Conn.			7.25 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.325 *A5* 8.625 *B5*						7.50 *A5,W6* 8.025 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland, Newport, Ky.							4.85 *A7,N5*		6.85 *N5*		
	Canton-Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2, T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.575 *P13*	5.075 *U1,R3, N4* 5.575 *P13*	6.85 *A5,B5, W10,L2, W8, L2, N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9, W10*	5.875 *W8*	4.85 *U1,13, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5,K2, R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth, Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,13, Y1*	5.075 *U1,13, Y1*	6.85 *R3,M5*	6.125 *U1,13, Y1*	8.325 *R3,M4*	7.425 *U1,13, Y1*	4.85 *U1,13, Y1*	5.925 *13*	6.85 *U1,Y1*	7.25 *U1,Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.525 *N4*	5.175 *N4*									7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C10,C11*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, C11,J3,R3, S9,B4,W10*	6.125 *U1,C11*	8.325 *A5,R3, S9,C8,W10*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											7.20 *P7*
	Wierton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.55 *K1*		7.55 *K1*	7.95 *K1*	
	Geneva, Utah	5.175 *C7*						4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	6.30 *R3*	7.175 *B2*		8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.775 *C7,P9* 5.825 *B2*	5.775 *C7,P9* 5.825 *B2*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2* 5.825 *N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.575 *A8*										7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2, R3* 5.375 *C16*	5.075 *T2, R3* 5.375 *C16*				7.425 *T2*	4.85 *T2, R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2*		6.95 *S2*	7.35 *S2*	7.45 *S2*

Steel Prices *(Effective Sept. 25, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa
C4 Claymont Products Dept., Claymont, Del
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill
D5 Henry Disston Div., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.
F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va

G2 Granite City Steel Co., Granite City, Ill
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O
J2 Jessop Steel Corp., Washington, Pa
J3 Jones & Laughlin Steel Corp. Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa
P3 Pilgrim Drawn Steel Div., Plymouth Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal
P10 Precision Drawn Steel Co., Camden, N
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn
S8 Superior Drawn Steel Co., Monaca, Pa
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75								
Youngstown *R3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Fontana *K1*	0.00	+15.25	3.00	+11.25	5.50	+7.75	8.00	+7.00	8.50	+6.00	9.00	+5.50	10.50	+5.75								
Pittsburgh *J3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Alton, Ill. *L1*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75								
Sharon *M3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Fairless *N2*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75								
Pittsburgh *N1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Wheeling *W5*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Wheatland *W4*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Youngstown *Y1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Indiana Harbor *Y1*	11.50	+5.75	14.50	1.25	17.00	3.75	19.50	4.50	20.00	5.50	20.50	6.00	22.00	5.75								
Lorain *N2*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75								
Youngstown *R3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Fairless *N2*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75								
Fontana *K1*	4.50		8.50		10.50		11.00		11.50		12.00		12.50									
Pittsburgh *J3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Alton, Ill. *L1*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75								
Sharon *M3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Pittsburgh *N1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	8.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Wheeling *W5*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	8.75								
Wheatland *W4*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	8.75								
Youngstown *Y1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	8.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Indiana Harbor *Y1*	16.00	2.25	20.00	6.25	22.00	9.75	22.50	8.50	23.00	9.50	23.50	10.00	22.00	8.75								
Lorain *N2*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½" and 3" pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

(Effective Sept. 25, 1956)

To identify producers, see Key on preceding page

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.845	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	2	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium	.83 D-3, D-5
Oil hardened manganese	.45 O-2
Special carbon	.41 W-1
Extra carbon	.345 W-1
Regular carbon	.29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

Stainless Type	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
300	304	34.60	38.00	41.50	.....
300	316	39.70	43.20	46.65	.....
300	321	36.35	39.80	43.50	.....
300	347	39.50	43.95	48.45	.....
400	405	29.20	33.15	37.05	.....
400	410, 430	28.70	32.65	36.55	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 41.40; 1 side, 33.60.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	9.00	9.20	.....
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Motor	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60	Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*) (20¢ higher, HR); Zanesville, Butler (*A7*).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight charges for seller's account.

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.35
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	167	181	...	195	187	8.10	8.50
Aliquippa, Pa. *J3*	167	184	...	...	184	8.10	8.65
Atlanta *A8*	169	187	...	197	193	8.20	8.80
Bartonville *K2**	169	187	...	197	193	8.20	8.80
Buffalo *W6*	...	...	...	...	...	8.10	8.50
Chicago, Ill. *N4***	167	185	167	195	191	8.10	8.70
Cleveland *A6*	173	...	...	...	...	8.10	.....
Cleveland *A5*	...	...	...	...	...	8.10	.....
Crawfordsville *M4**	169	187	...	197	193	8.20	8.80
Donora, Pa. *A5*	167	181	...	195	187	8.10	8.50
Duluth *A5*	167	181	...	195	187	8.10	8.50
Fairfield, Ala. *T2*	167	181	...	195	187	8.10	.....
Galveston *D4*	169‡	...	...	...	...	...	.....
Houston *S2*	172	186	...	200	192	8.35	8.75
Johnstown, Pa. *B3**	167	185	167	...	191	8.10	8.70
Joliet, Ill. *A5*	167	181	...	195	189	8.10	.....
Kokomo, Ind. *C9*	169	183	...	197	189	8.20	8.60
Los Angeles *B2**	...	...	...	...	...	9.05	9.45
Kansas City *S2*	172	186	...	200	192	8.35	8.75
Minnequa *C6*	172	186*	172	200	192*	8.35	8.75
Monessen *P6*	167	185	...	...	191	8.10	8.10
Pittsburg, Cal. *C7*	186	204	...	...	207	9.05	9.45
Portsmouth *P7*	...	...	...	...	...	8.10	.....
Rankin, Pa. *A5*	167	181	...	...	187	8.10	8.50
So. Chicago *R3*	167	181	...	195	187	8.10	8.50
S. San Francisco *C6*	...	...	...	219	...	9.05	9.45
Sparrows Pt. *B3**	...	...	...	197	193	8.20	8.80
Struthers, O. *Y1*	...	...	...	...	...	8.10	8.60
Worcester *A5*	173	...	...	...	...	8.40	8.80
Williamsport, Pa. *S5*	...	...	175	...	...	...	.....

Galvanized products computed with zinc at 5¢ per lb. Exceptions: * zinc at 12.5¢ per lb; ** 13½¢ zinc.

‡—Wholesalers only.

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery ‡ Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As Rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As Rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.07	9.27	9.83	8.16	.....	8.40	8.44	8.30	10.14	.....	.....	.....	.....
Baltimore	$.10	7.79	9.54	9.12	8.27	.....	8.12	8.57	8.34	9.09	14.99	14.44	18.39	18.09
Birmingham	.15	7.68	8.88	8.85	7.78	.....	8.01	8.05	7.91	10.04	.....	.....	.....	.....
Boston	.10	8.70–8.80	9.73–9.83	10.82–11.02	8.79–8.89	.....	8.98–9.08	8.90–9.00	8.88–8.98	10.71–10.81	15.05	14.45	18.51	18.10
Buffalo	.15	7.90	9.05	10.87	8.15	.....	8.40	8.40	8.15	8.85	15.00	14.45	18.40	.....
Chicago	.15	7.70–7.85	8.88–9.05	9.85	7.78–7.93	.....	8.01–8.16	8.05–8.20	7.91–8.06	8.35–8.50	14.65	14.10	18.05	17.75
Cincinnati	.15	7.97	9.04	9.85	8.21	.....	8.49	8.70	8.34	8.97	14.93	14.38	18.33	18.03
Cleveland	.15	7.83	9.03	9.75	8.03	.....	8.36	8.53	8.14	8.75	14.73	14.18	18.13	17.83
Denver		9.55	11.09	12.41	9.70	.....	9.80	9.60	9.75	10.54	.....	.....	.....	19.79
Detroit	.15	8.06	9.28	10.17	8.25	.....	8.48	8.70	8.33	8.83	.....	14.04	.....	17.09
Houston		8.70	9.65	.....	8.80	.....	8.60	8.90	8.95	10.55	15.50	.....	19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	.....	8.83	8.87	8.73	9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.00	10.75	11.75	9.20	.....	9.45	9.05	8.90	11.80	15.85	15.35	19.70	19.45
Memphis	.15	8.02	9.22	....	8.12	.....	8.35	8.39	8.25	9.85	.....	.....	.....	.....
Milwaukee	.15	7.97	9.17	9.97	8.05	.....	8.28	8.39	8.18	8.72	14.77	.....	18.17	17.87
New York	.10	8.45	9.63	10.33	8.91	.....	8.88	8.84	8.93	10.71	15.02	14.47	18.42	18.12
Norfolk	.20	8.00	....	.....	8.40	.....	8.35	8.70	8.45	10.70	.....	.....	.....	.....
Philadelphia	.10	7.89–7.99	9.08–9.18	9.66–10.22	8.58–8.68	.....	8.28–8.38	8.38–8.48	8.37–8.47	9.12–9.22	14.80	14.15–14.25	18.20	17.90
Pittsburgh	.15	7.83	9.03	10.20	8.03**	.....	8.16	8.29	8.06	8.75	14.65	13.80–14.10	18.05	16.85–17.75
Portland		8.90	9.65	11.40	9.05	.....	8.70	8.90	8.95	13.55	16.70	16.10	20.40	20.25
San Francisco	.10	8.85	10.40	10.90	9.05	.....	8.95	8.95	8.90	12.40	15.85	15.35	19.70	19.45
Seattle	.00	9.35	11.20	11.55	9.50	.....	9.05	9.15	9.30	13.15	16.10	15.55	19.50	19.20
St. Louis	.15	8.02–8.17	9.16–9.36†	10.03–10.18	8.11–8.26	.....	8.34–8.49	8.48–8.63	8.25–8.40	8.93–9.08	14.83–14.98	14.28	18.23–18.38	17.93
St. Paul	.25	8.35	.....	10.37	8.45	.....	8.86	8.90	8.58	9.27	.....	.....	.....	14.62

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

** F.O.B. Plant, warehouse price. † 16 gage. ‡ Deduct for country delivery.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Baltimore, Md. *T8*	8.25	10.18	12.90	15.30	18.25
Bristol, Conn. *W12*	...	...	12.90	15.30	18.25
Boston *T8*	8.50	10.10	12.90	15.30	18.25
Buffalo, N. Y. *R7*	7.95	9.80	12.60	15.00	17.95
Carnegie, Pa. *S9*	‡	9.80	12.60	15.00	.....
Cleveland *A5*	7.95	9.80	12.60	15.00	17.95
Detroit *D1*	8.05	9.90	12.70	15.10	.....
Detroit *D2*	...	...	...	...	.....
Dover, O. *G4*	7.95	9.80	12.60	15.00	17.95
Franklin Park, Ill. *T8*	8.05	9.80	12.60	15.00	17.95
Harrison, N. J. *C11*	...	...	12.90	15.30	18.25
Indianapolis *C5*	8.10	9.95	12.60	15.00	17.95
New Castle, Pa. *B4*	7.95	9.80	12.60	15.00	.....
New Haven, Conn. *D1*	8.40	10.10	12.90	15.30	.....
Pawtucket, R. I. *N7*	8.50	10.10	12.90	15.30	18.25
Pittsburgh *S7*	7.95	9.80	12.60	15.00	17.95
Riverdale, Ill. *A1*	8.05	9.80	12.60	15.00	17.95
Sharon, Pa. *S1*	8.05	9.90	12.70	.....	.....
Trenton *R4*	...	10.10	12.90	15.30	18.25
Wallingford *W1*	8.40	10.10	12.90	15.30	18.15
Warren, Ohio *T4*	7.95	9.80	12.60	15.00	17.95
Weirton, W. Va. *W3*	7.95	9.80	12.60	15.00	17.95
Worcester, Mass. *A5*	8.50	10.10	12.90	15.30	18.25
Youngstown *C5*	7.95	9.80	12.60	15.00	17.95

‡ On Application.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	44.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	12	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
National Tube	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	44.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
Pittsburgh Steel	2	13	34.88	40.85	.....	.....
	2½	12	46.98	55.01	.....	.....
	3	12	54.24	63.53	.....	.....
	3½	11	63.32	74.16	.....	.....
	4	10	84.09	98.47	.....	.....

(Effective Sept. 25, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.075	6.00	6.35				
So. Chicago *R3*				6.775			
Ensley *T2*	5.075	6.00					
Fairfield *T2*		6.00		6.775		6.025	
Gary *U1*	5.075	6.00				6.025	
Ind. Harbor *I3*	5.075		6.35	6.775		6.025	
Ind. Harbor *Y1*				6.775			
Johnstown *B3*		6.00					
Joliet *U1*	5.075		6.35				
Kansas City *S2*				6.775			
Lackawanna *B3*	5.075	6.00	6.35			6.025	
Lebanon *B3*							13.10
Minnequa *C6*	5.075	6.50	6.35	6.775		6.025	13.10
Pittsburgh *P5*				6.775	12.85		
Pittsburgh *J3*				6.775			13.10
Seattle *B2*				9.275		6.35	16.60
Steelton *B3*	5.075		6.35			6.175	13.60
Struthers *Y1*				6.775			
Torrance *C7*							
Williamsport *S5*		6.15					
Youngstown *R3*				6.775			

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. ..... $14.50 to $14.75
Foundry, beehive (f.o.b. oven)
$17.00 to $18.00

Foundry, oven coke
Buffalo, del'd $30.75
Detroit, f.o.b. 29.50
New England, del'd 30.55
Seaboard, N. J., f.o.b. 28.75
Philadelphia, f.o.b. 28.50
Swedesland, Pa., f.o.b. 28.50
Painesville, Ohio, f.o.b. 29.50
Erie, Pa., f.o.b. 29.50
Cleveland, del'd 31.55
Cincinnati, del'd 28.59
St. Paul, f.o.b. 28.50
St. Louis, f.o.b. 30.50
Birmingham, f.o.b. 27.60
Milwaukee, f.o.b. 29.50
Lone Star, f.o.b. 25.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.75	17	72	10.35
7	60	24.50	14	72	10.65
5	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots 62.92
Electrodeposited 50.25
Brass, 80-20, ball anodes, 2000 lb or more 60.00
Zinc, ball anodes, 2000 lb lots 21.25
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon 90.50
(rolled depolarized add 3¢ per lb)
Cadmium $1.70
Tin, ball anodes and elliptical. $1.06 to $1.10

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 80.50
Copper sulphate, 5 or more 100 lb bags, per cwt. 27.15
Nickel salts, single, 4-100 lb bags .. 38.25
Nickel chloride, freight allowed, 300 lb 46.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums 22.35
(Philadelphia price 22.60)
Zinc cyanide, 100 to 900 lb. 55.55
Potassium cyanide, 100 lb drum N. Y. 43.00
Chromic acid, flake type, 1 to 20 100 lb drums 39.25

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts	Full Container Price	Net Discounts 30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	55	58½	60½	61½
⅝" thru 1" x longer than 6"	46½	50	52½	54
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	55	58½	60½	61½
Lag, all diam. x 6" & shorter	55	58	60	61
Lag, all diam. longer than 6 in.	47	50	52	53
Plow bolts, ½" and smaller x 6" and shorter	54	57½	59	60

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy. — Full Case or Keg Price

⅜ in. or smaller 63
⅞ in. to 1 in. inclusive 59½
1⅛ in. to 1½ in. inclusive 64
1⅝ in. and larger 58

C.P. Hex regular & hvy.

⅜ in. and smaller 63
⅞ in. to 1½ in. inclusive 59½
1⅝ in. and larger 58

Hot Galv. Nuts (All Types)

⅝" and smaller 50

Semi-finished Hex Nuts

⅜ in. and smaller 62
⅞ in. to 1½ in. inclusive 59½
1⅝ in. and larger 58
(Add 25 pct for broken case or keg quantities)

Finished

1" and smaller 65

Rivets

Base per 100 lb
½ in. and larger $10.85
Pct Off List
7/16 in. and smaller 26½

Cap Screws

New std. hex head, packaged	Discount (Packages) Bright Treated	H. C. Heat
⅝" diam. and smaller x 6" and shorter	47	34
¾", ⅞" and 1" diam. x 6" and shorter	31	13
⅝" diam. and smaller x longer than 6"	18½	+1
¾", ⅞" and 1" diam. & longer than 6"	5½	+19½

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	47	63
¾" through 1" dia. x 6" and shorter	31	51½

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 1/16" through ½" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts,

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	19	33
Bulk — Quantity		
To ¼" diam. incl. — 25,000-200,000	9	54
5/16 to ½" diam. incl. — 15,000-100,000	9	54
All diam. over 3" long — 5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

	Discount Hex	Square
In cartons	16	19
In Bulk — Quantity		
⅜" diam. & smaller — 15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham 119.0
New York 131.4
Chicago 133.4
San Francisco-L. A. 140.2
Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 37, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick — *Carloads per 1000*
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00) $128.00
No. 1 Ohio 128.00
Sec. quality, Pa., Md., Ky., Mo., Ill., 114.00
No. 2 Ohio 98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00) 20.00

Silica Brick
Mt. Union, Pa., Ensley, Ala. $140.00
Childs, Hays, Pa. 145.00
Chicago District 150.00
Western Utah 144.00-165.00
California 170.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville 150.00-157.00
Silica cement, net ton, bulk, Latrobe 26.50
Silica cement, net ton, bulk, Chicago 24.00
Silica cement, net tons, bulk, Ensley, Ala. 25.50
Silica cement, net ton, bulk, Mt. Union 23.00
Silica cement, net ton, bulk, Utah and Calif. 35.00

Chrome Brick — *Per net ton*
Standard chemically bonded, Balt. $98.00
Standards chemically bonded, Curtiner, Calif. 108.00
Burned, Balt. 92.00

Magnesite Brick
Standard Baltimore $121.00
Chemically bonded, Baltimore 109.00

Grain Magnesite — St. ⅝ to ½-in. grains
Domestic, f.o.b. Baltimore in bulk. $69.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
In bulk 43.00
In sacks 49.00

Dead Burned Dolomite — *Per net ton*
F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $16.00
Midwest 15.60
Missouri Valley 15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron f.o.b. Riverton, N. J., ocean bags 8.50¢
Canadian sponge iron, Del'd in East, carloads .... 9.5¢
Domestic sponge iron, 98+% Fe, carload lots ..... 8.5¢
Electrolytic iron, annealed, imported 99.5+% Fe..... 37.5¢
domestic 99.5+% Fe..... 36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe 57.0¢
Electrolytic iron melting stock, 99.84% pure..... 22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe..86.0¢ to $1.55
Aluminum freight allowed.. 38.00¢
Brass, 10 ton lots.....37.50¢ to 50.00¢
Copper, electrolytic ..... 59.50¢
Copper, reduced ..... 59.50¢
Cadmium, 100-199 lb, 95¢ plus metal value
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd... $5.00
Lead .....8.90¢ plus metal value
Manganese ..... 70.0¢
Molybdenum, 99% .....$3.35 to $3.85
Nickel, unannealed $1.00
Nickel, annealed $1.06
Nickel, spherical, unannealed #80 ..... $1.12
Silicon ..... 43.50¢
Solder powder..7.0¢ to 9.0¢ plus met. value
Stainless steel, 302..... 99.0¢
Stainless steel, 316..... $1.32
Tin .....14.00¢ plus metal value
Tungsten, 99% (65 mesh)... $4.50
Zinc, 10 ton lots .....18.75¢ to 32.50¢

Ferroalloy Prices

(Effective Sept. 25, 1956)

(Other ferroalloy prices, normally appearing on this page, will next be published in Oct. 4 issue.)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C ...	41.50	0.20% C ...	38.50
0.03% C ...	41.00	0.50% C ...	38.25
0.06% C ...	39.50	1.00% C ...	37.50
0.10% C ...	39.00	1.50% C ...	37.35
0.15% C ...	38.75	2.00% C ...	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.75
0.025% C (Simplex) 34.75
0.10% C, 50-52% Cr, 2% max Si.... 35.75
8.50% max. C, 50-55% Cr, 3-6% Si. 24.00
8.50% C, 50-55% Cr, 3% max Si.... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 33-91% Cr, 0.75% Fe..	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr. 20% Fe ⅛ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19½ Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11% Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.75
Johnstown, Pa.	10.75
Sheridan, Pa.	11.75
Philo, Ohio	11.75
S. Duquesne	10.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.90
Ton lots packed	16.30

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	33.00
Ton lots	35.00
250 to 1999 lb	37.00
Premium for hydrogen-removed metal	0.75

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b shipping point.

Carloads bulk	12.95
Ton lots	14.60
Briquet contract basis carloads, bulk, delivered, per lb of briquet.....	14.40
Ton lots, packed	16.80

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn.....	35.80	38.60	39.80
0.07% max. C	33.75	36.55	37.75
0.10% max. C	33.00	35.80	37.00
0.15% max. C	32.25	35.05	36.25
0.30% max. C	30.75	33.55	34.75
0.50% max. C	30.25	33.05	34.25
0.75% max. C, 80.85% Mn, 5.0-7.0% Si....	27.25	30.05	31.25

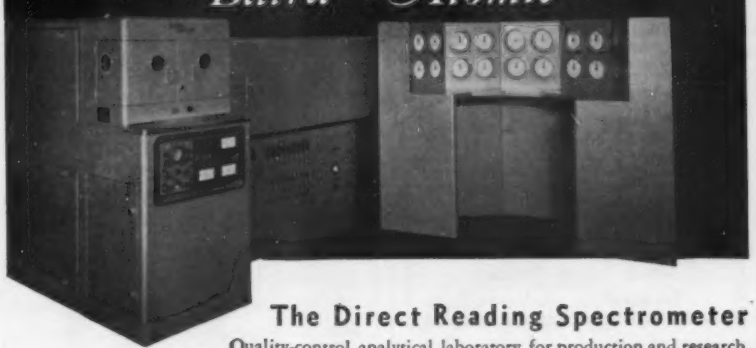
Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

SPECTROGRAPHIC EQUIPMENT for Metal Analysis by Baird – Atomic



The Direct Reading Spectrometer

Quality-control analytical laboratory for production and research. Simple, rapid operation — forty seconds for complete analysis on dials reading directly in percent concentration. Permanent optical alignment with the Automatic Servo Monitor. Other features include: unique (patented) measuring system . . . plug-in components assuring continuous operation . . . rugged design for plant operation . . . and versatile specimen holders.

Baird-Atomic offers a complete line of spectrographic equipment for the analysis of metals in production and fabrication.

B-A instruments provide rapid, accurate analysis . . . simple, stable operation, trouble-free economical performance.

Spectromet Designed for production-floor operation by non-technical personnel. Sealed housing provides complete environmental protection of optical and electronic systems. Spectromet provides rapid direct-reading results, extremely simple operation. No critical adjustments. Automatic Servo Monitor for permanent optical alignment. Analysis of eight elements in 40 seconds.

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Pickup Comes . . . Pittsburgh business picked up in September after a seasonally slow summer.

Inquiries are coming from both domestic and foreign buyers. Heaviest demand is for bar mills but flat rolling mills are also moving well. Sheet mills are not sharing in the activity, but two-high and four-high strip mills are attracting wide interest. Demand for small and medium sized cold mills for specialty work outside the steel industry continues strong.

Shears, straighteners, levelers and other accessory items are showing good activity. Bar straighteners are scarce; sheet straighteners more plentiful.

Equipment Lack Hurts . . . One dealer agrees that demand is strong, particularly for bar mills, but says a lack of good equipment is slowing sales activity.

Demand for cranes continues steady, averaging, in one case, about an inquiry a day. Buyers are looking for heavy cranes, equipped to run on ac current. They want late models with anti-friction bearings.

Uncovering the right models is a problem. In some cases, the dealer will have to find models that are not for sale but are standing idle. Then he shows the company that it would be better off selling the crane and possibly putting in a smaller unit.

Both Big and Small . . . Two trends have made for a fairly good turnover in cranes. The steel mills are going to bigger ladle cranes. Where a 150-ton ladle crane used to be considered big, now the large producers are looking for 300-ton ladles. This has turned loose smaller cranes for sale to electric furnace operators.

On the other hand, the railroads are going to smaller cranes because of the swing from steam to diesel power. This again is turning cranes loose for resale. And tax loss allowances have encouraged a faster turnover.

Persistance Needed . . . There is a lively demand for press brakes, shears and other types of fabricating equipment but dealers have a problem finding anything other than the older and smaller models. In compressors and machine tools, the story is the same: plenty of inquiries, but a scarcity of good equipment. The shortage seems to be nationwide; a Pittsburgh dealer has had little luck picking up equipment by circularizing the trade.

In the face of this shortage and the delays it has brought, buyers are showing unusual persistance in their search for used equipment. The same inquiries will kick around for months and months. This is attributed to resistance on the part of users to prices of new machines.

Going, Going, Going . . . In West Coast markets this situation has also lead to problems. With no supply cushion, backlogs are out in the used machinery picture.

One Seattle dealer sums it up: "You either have it or you don't. Buyers want what they are looking for right away or they go somewhere else."

Firms that can't sell their used machinery eventually turn it over to the high bidder. But it's usually after enough time has gone by for the machine's value to drop. Some equipment dealers are up in arms over this practice. They're fearful it will spread to other areas.

Brake shears and punch presses are in great demand in the Seattle area. This reflects expanding airplane production at Boeing Airplane Co. Production type equipment isn't going as strong as it has in the past.

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BENDER & STRAIGHTENER
#4 H & J. Capacity 15" I-beams, 9" Girder Rail, 100 lb. Tee Rails, Motor Drive
BENDING ROLLS
6' x 3/16" Niagara Initial Type
8' x ⅛" Webb 129-V Pyramid Type
12' x ¼" Southwark Pyramid Type
10' x ¼" Niles Pyramid Type
BRAKES—LEAF TYPE
10' x 16" Ga. Dreis & Krump Hand Operated
12' x ⅛" Dreis & Krump Motor Driven
BRAKES—PRESS TYPE
10' x ¼" Verson
10' x ¼" Superior Hydraulic, NEW
12' x ⅛" Superior Hydraulic, NEW
CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	29' Span 230 Volt D.C.
5 ton Shepard Niles	55' Span 220 Volt D.C.
5 ton Cleveland	90' Span 230 Volt D.C.
10 ton Cyclops	40' Span 220/440 A.C.
10 ton P&H	96' Span 220 Volt D.C.
15 ton P&H	46' Span 230 Volt D.C.
20 ton Toledo	75' Span 550/3/60 A.C.
25 ton L-B	60' Span 440/3/60 A.C.
25 ton L-B Incl. 300 ft. Runway	75' Span 220/3/60 A.C.
60 ton Modern	68' Span 220/3/60
80 ton Niles	72' Span 230 Volt D.C.
120 ton Niles	63' Span 440/3/60 A.C.

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10 Ton P&H Type HMR 440/3/60—New 1952
FORGING MACHINES
2" Ajax Air Clutch
1" to 5" Acme, Ajax, National
HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING—800 lb. to 20,000 lb.

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44" Newbold, Nine Rolls 4" Dia.
48" Aetna Standard, 17 Rolls 3½" Dia.
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72" McKay, 17 Rolls 4¼" Dia.
72" McKay, 17 Rolls 2½" Dia. Backed-up
PLANERS—PLATE EDGE
30 Ft. Southwark, Capacity 1½"
35 Ft. Southwark, Capacity 1½"
PRESSES—HYDRAULIC
250 ton Bliss Double Acting 42" Stroke 48x49" Bed
500 ton Elmes 18" Stroke Lower Platen 38"x66"
750 ton Baldwin Triple Acting Bolster 84" x 132"
1200 ton United Steam Hydraulic Forging Press
4500 Baldwin-Lima-Hamilton Hydr. Forging Press
PRESS—INCLINED
125 ton Beatty Open Back, 1½" Stroke, Area of Bed 28½ x 26½"
PRESS—STRAIGHT SIDE
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250 ton Bliss, 16" Stroke, 29 x 29" Bed
250 ton Toledo, 6" Stroke, 36 x 72" Bed
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#265¼ D Toledo Double Crank Toggle Drawing 15" Stroke Bolster 108" x 60"
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72" Bertsch, Seven Rolls 7" Dia.
86" H & J. Six Rolls 10" Dia.
12' Newbold, Nine Rolls 14" Dia.

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10" x 16" Single Stand, Two High
12" x 14" Twelve Stand, Two High Strip Mill
12" x 16" Phila. Single Stand, Two High
15" x 30" G & M Single Stand, Two High
16" x 24" Farrel Two Stand, Two High
20" x 60" Two High Breakdown Mill
22" x 12" x 40" Lewis 3-High Shut Mill
26" x 54" United Single Stand, Two High
26" x 72" H.P. Cold Rolling Mill
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6" x 6" x ⅝" Hilles & Jones
SHEAR—BAR
#4 H & J Guillotine Type, Capacity 4" Round, 3½" Square, 12 x 1½" Flat
SHEAR—ROTARY
#25A Quickwork Whiting, 3/16" Capy.
#250 Kling, ¾" Capy.
SHEARS—SQUARING
8' x ¼" Niagara
10' x ⅛" Cincinnati, LATE
10' x ¼" Toledo
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12" Blake & Johnson
32" Yoder #3, 5" Arbor, Motor Driven Capacity up to ¼"
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700-ton Ajax High Speed Forging Press
50,000# Standard Double Draw Bench
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D. C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
1	1000	G.E.	MCF	600	350/700
1	940	Whse.	QM	250	140/170
1	800	Whse.		250	450/550
1	500	Whse.	CC-216	600	300/900
8	450	Whse.		550	415
1	250	G.E.	MPC	230	400/600
1	200	Whse.	CB-5113	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
1	150	Whse.	SK-151B	230	900/1800
1	120	G.E.	MPC	230	250/1000
1	125	Whse.	SK-183	220	850
2	100	Whse.	SK-181	230	450/1000
2	75	C.W.	53H-TEFC	220	860
1	50	G.E.	MD-412AE	230	550
1	50	Whse.	SK-131.5 B.B.D.P.	230	600/2200
4	30/40	Whse.	SK-131	220	500/1500

M-G Sets—3 ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
1	3000(3U)	G.E.	514	600	4000/6900/13200
2	2000/2400	G.E.	450	250/300	2300/4600
1	1750/2100	G.E.	514	1100	4000/6900/
1	2000	G.E.	500	25cy 600	11000
1	2000	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1000	G.E.	900	250	4000/6900
1	750	G.E.	720	125/250	2300/4600
1	500	G.E.	900	540/540	4150
1	500	Whse.	900	125/250	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	3000	A.C.	OISC	3	33000x2300
1	2500	A.C.	Furnace	3	12300x147/113.5
1	2500	A.C.	OISC	3	34520x13800
4	2000	Whse	OISC	3	6900x480
1	2000	Whse.	OISC	3	6900x2300/3985Y
3	1000	G.E.	HVDDJ	1	2400x480
1	800	G.E.	H	1	13800x460
3	1000	Wagner	OISC	1	13200x460
2	500	G.E.	H	1	2400/4800x480
1	500	Al. Ch.	OISC	1	4800x208
1	500	G.E.	OISC	1	13200x2300
3	667	G.E.	HD	1	13800x2300
3	500	Kuih	OISC	1	13200x6600
3	333	G.E.	HS	1	7200x2400/4160Y
3	333	G.E.	HD	1	13200x2300
3	333	G.E.	HSWR	1	2300/4000x220/460
3	333	G.E.	H	1	6900x230/460
1	300	G.E.	HT	3	4160x480/277

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14" x 36" Pratt & Whitney hyd. vert. surface, 1942.
No. 74 Heald hyd. pl. internal, X-sliding H. S., 1941.
16" x 30" Landis type C hyd. pl. cylindrical, 1942.
6" x 30" Cincinnati EA Filmatic pl. cylindrical, 1942.
HAMMERS
No. 3C Chambersburg pneumatic, serial No. 2297.
No. 6-1 Nazel, pneumatic, late.
No. 6B Nazel, self-contained.
LATHES
No. 3 Gisholt Univ. Turret Lathes (2), 1942.
14" x 6' Hendey Toolroom, 1940.
15" 30" Lipe Carbo-Matic, 1942.
36" x 42" Bullard New Era vertical turret lathes.
128" x 96' CC Niles Bement Pond engine lathe, 80 HP, M.D.
MILLING MACHINES
No. 2 Brown & Sharpe vertical mill, new 1943.
No. 4 Cincinnati high power plain horizontal mill, serial E 506 J.
No. 5-48 Cincinnati hydromatic duplex mill, serial 3B5IDIK-5.
No. 2-24 Cincinnati automatic simplex mill, serial No. 1B3PIT-1.
PLANERS
42" x 42" x 12' Liberty dbl. housing planer, 35 HP M.D.
48" x 48" x 10' Gray Maxi-Service.
PRESSES
50 ton No. 92½C Toledo D.C. Str. Side.
250 ton No. 795½-72 Toledo D.C., Toggle drawing.
500 ton No. 1039 Hamilton D.C. adj. hed. 60" x 102".
2000 ton No. 6 National Maxipress Forging Press.
SHAPERS & SLOTTERS
24" Gould & Eberhardt Universal.
32" G & E Invincible, F.M.D.
36" Rockford hyd. vertical slotter, new 1944.
UPSETTERS
1½" National Upsetter, guided ram, hard ways.
3½" Ajax suspended slides, steel frame.
4" National high duty, susp. & guided rams.
7½" National Upsetter, air clutch, new 1944.

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1—36" x 144" approximately Lobdell Roll Grinder for Sheet Mill Rolls.

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Qu.	KW	Make	R.P.M.	D.C. Volts	A.C. Volts
1	2500	Whse.	720	600	4160/2300
1	2000	Al. Ch.	720	250	4160/2300
1	1500	Whse.	720	600	2300
1	1120	Elliott	720	565/280	2300
1	500	G.E.	1200	250	2300/440
1	500	Cr. Wh.	720	575/600	2300/440
1	300	G.E.	1200	350/275	2300
1	200	Elliott	1200	125	4000/2300
8	150	G.E.	1200	250	2300/440
1	120	Whse.	1200	250	2300/440
1	100	Al. Ch.	1200	250	4000/2300

LARGE MILL TYPE MOTORS

Qu.	HP	Make	R.P.M.	Volts	Type
1	2000	Whse.	600	525	Tandem
1	1500	Whse.	600	525	Rev.
1	700	Al. Ch.	185	230	Mill
2	600	Al. Ch.	300/600	600	Mill
3	600	Whse.	110/230	230	Mill
1	450	Whse.	450/900	230	WK
1	300	Whse.	900	230	Mill
4	275	Whse.	425/850	230	QM-660.6
1	150	Whse.	360/720	600	QM-666.5

SLIP RING MOTORS
Constant Duty 3 Phase 60 Cycle

Qu.	HP	R.P.M.	Make	Type	Volts
1	100	435	Al. Ch.		440/230
3	100	695	G.E.	1-15A-M	2300
1	100	900	Wh. Dy.		2300
1	100	1200	Whse.	CW	440/220
1	104	870	Whse.	CW	440/220
1	125	600	G.E.	1-14-M	2200
1	150	450	Whse.	CW-1000	440
1	150	490	Whse.	CW	440/220
1	150	585	Whse.	CW	4160/2300
1	150	720	Al. Ch.	ARY	440/220
1	200	435	G.E.	I-M	440
1	200	490	G.E.	I-14-M	2200
3	200	585	G.E.	I-12-M	2200
1	250	300	G.E.	MT-414	2200
1	250	720	Al. Ch.	ARY	440
1	250	900	Whse.	CW	2300
1	400	360	G.E.	MT-424	2300/440
1	400	505	Al. Ch.	ARY	2200
1	425	392	G.E.	I-M	440
1	450	440	Whse.	CW	2200
1	450	514	G.E.	I-M	2200
1	500	450	G.E.	I-M	2300
1	500	514	Al. Ch.	ANY	2200
1	700	385	Whse.	CW	2300
1	750	400	G.E.	I-M	2300
1	1000	445	Whse.	CW	2300
1	1250	592	Whse.	CW	6600
1	1500	300	G.E.	MT	2300
1	1800	270	Whse.	Mill type	6600
1	2500	257	G.E.	Mill type	6600

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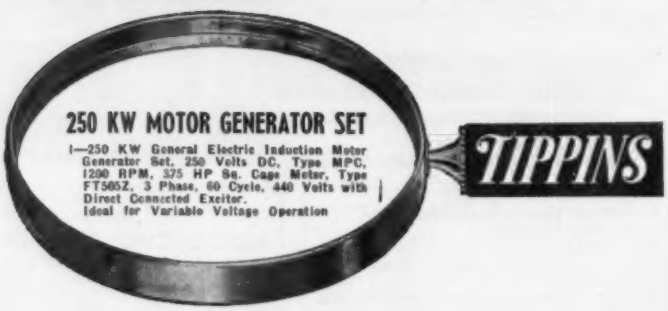
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1—250 KW General Electric Induction Motor Generator Set, 250 Volts DC, Type MPC, 1200 RPM, 375 HP Sq. Cage Motor, Type FT505Z, 3 Phase, 60 Cycle, 440 Volts with Direct Connected Exciter.
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36" x 36" x 8' Liberty Planer, motor drive, box table, 3 heads.

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#2 Southwark single end punch & shear, cap ½" x ½" throat 36" with motor.

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ALL MACHINES HAVE AIR CLUTCH AND SOME HAVE AIR CUSHIONS AND MOTOR DRIVEN RAM ADJUSTMENTS. STILL SET UP IN PLANT.

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50'0" x 200'0" with 15 ton AC floor operated crane, mfd 1943, 25'3" under eaves, 20'0" c to c columns. Immediate delivery.
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1—30T Browning Diesel—1943

1—25T Industrial, Steam, Erection, 85' boom

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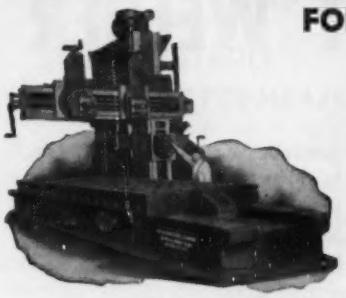

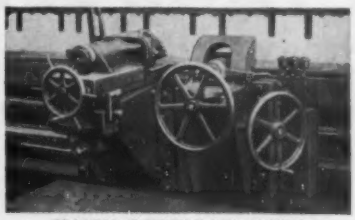

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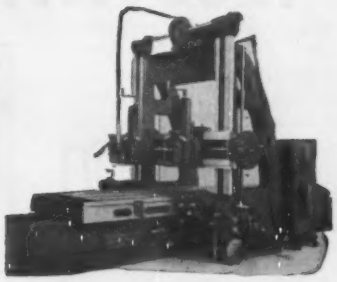

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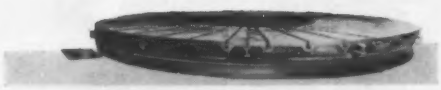

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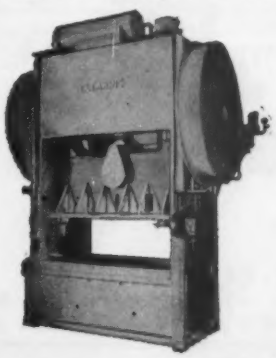

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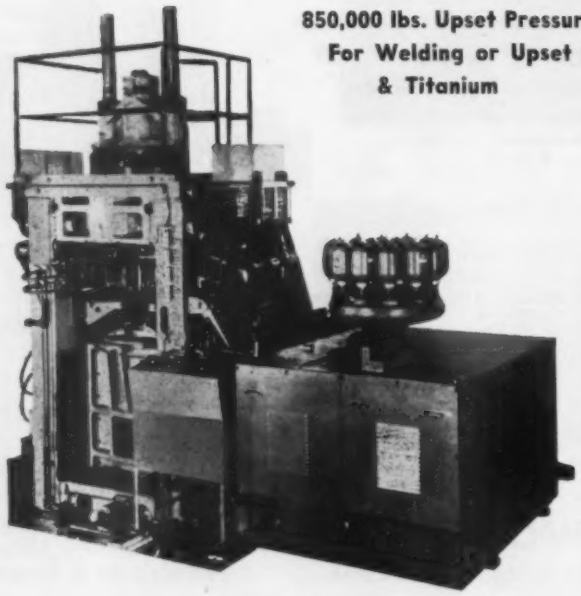

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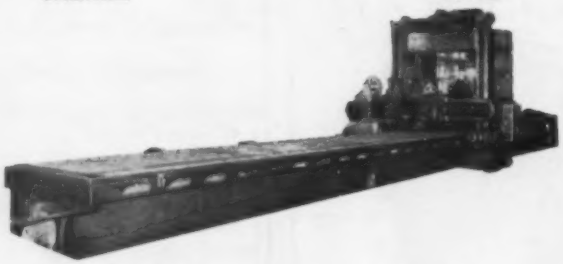

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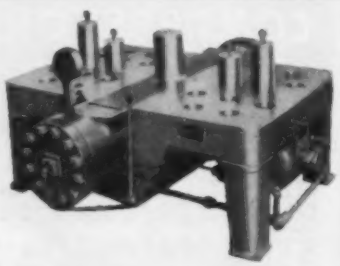

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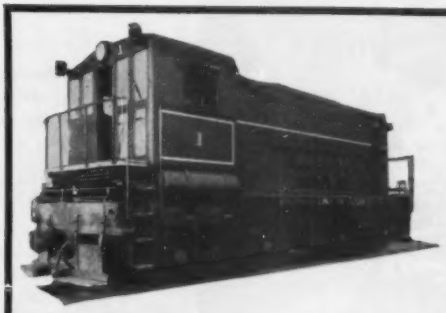

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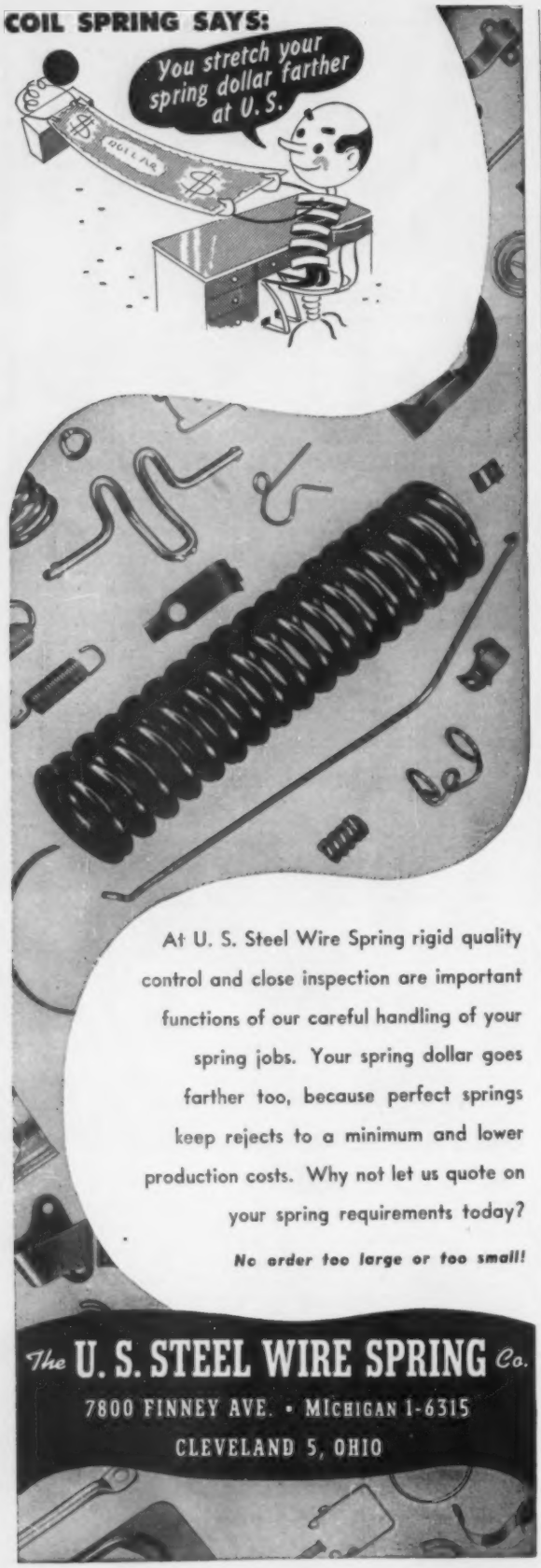
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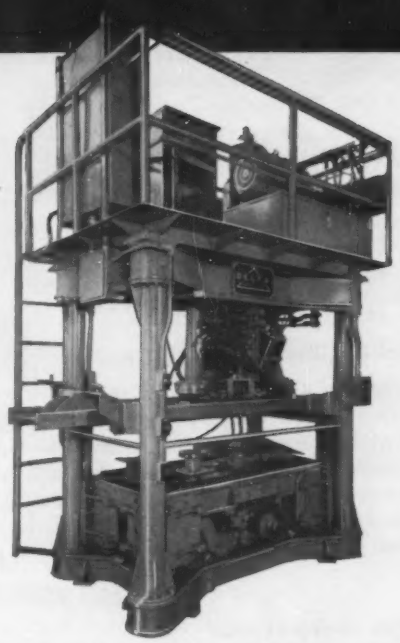

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METALWORKING BRIEFS

No Comment on J&L Texas Land Option

A Jones & Laughlin Corp. spokesman would neither confirm nor deny reports that the company had taken option on 5000 acres near Houston for its proposed $250 million steel mill. J&L recently filed with ODM for a certificate of necessity that would grant fast-tax write-off privileges for the mill. (See Tax-Am report, p. 167.)

Secretary Weeks Names New BDSA Chief

Secretary of Commerce Sinclair Weeks announced appointment of Horace B. McCoy, veteran civil service official, as administrator of the Commerce Department's Business and Defense Services Administration. Formerly deputy administrator of BDSA, he succeeds Charles F. Honeywell, whose resignation is effective Oct. 15.

Chevvy Fuel Injection System Optional

Fuel injection systems designed into the new 1957 Chevrolet will be standard equipment on the Corvette and optional equipment on other models. It will be the first such system available in a production auto. Chevvy goes on display Oct. 19.

National Distillers To Refine Titanium

U. S. Industrial Chemicals Co., a division of National Distillers Products Corp., plans to produce titanium sponge at its newly acquired Ashtabula, O., plant. Using sodium as a reducing agent, the company hopes to turn out 5000 tons of titanium annually at a cost lower than that of present commercial methods. Peak production is expected by the end of next year.

GE Raises Turbine Prices

The price of steam turbine generators was raised 10 pct by General Electric Co., leading the way for other producers to do likewise. Increase affects units of 2500 kw and larger, ship propulsion turbines and gears, mechanical drive turbines of 5001 hp and larger and speed reduction and increasing gears.

U.S. Firm Buys Soviet Oilfield Equipment

Dresser Industries, Inc., Dallas, Texas, revealed the purchase of 40 turbo oil drills from the Soviet Union. The deal was "entirely monetary" and involved no exchange of technical data, a spokesman said.

New Clad Steel Prices for Lukens

New prices, effective on and after Sept. 21, on the company's Inco clad steels are announced by Lukens Steel Co., Coatesville, Pa. Prices for Monel grades are: 5 pct, $40.30; 10 pct, $49.10; 15 pct, $57.95; and 20 pct, $66.80. Inconel grades are: 5 pct, $45.70; 10 pct, $54.80; 15 pct, $63.85; and 20 pct, $73.00.

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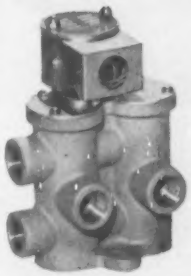

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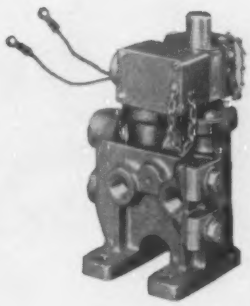

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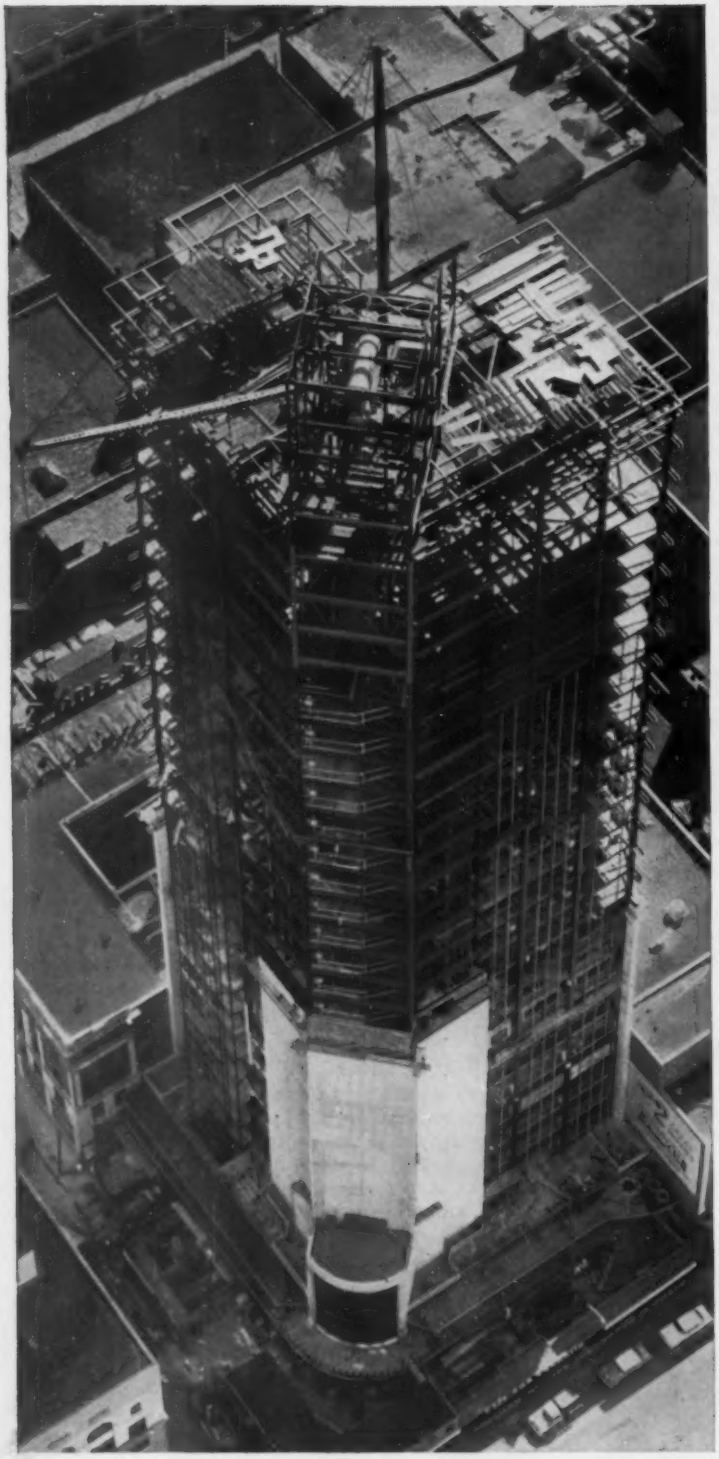

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Bolted Frame For Nashville Building

Here you have a bird's-eye view of the steelwork for the 30-story home office building erected at Nashville for the Life & Casualty Insurance Company of Tennessee. The framework for the 409-ft structure, weighing about 3,350 tons, was erected quickly and economically by means of bolting. Bethlehem High-Strength Bolts join the structural members.

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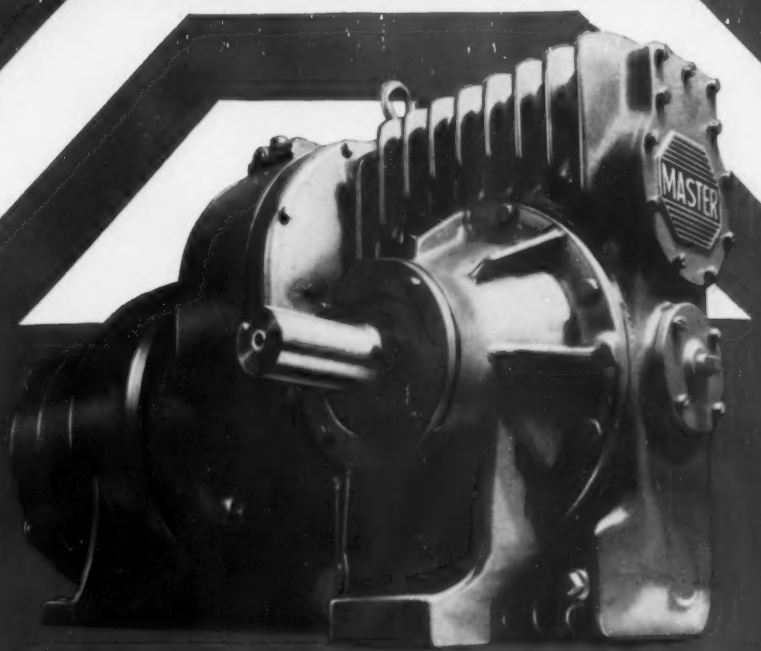

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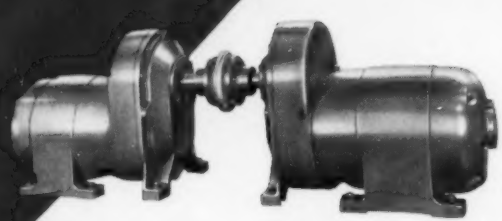


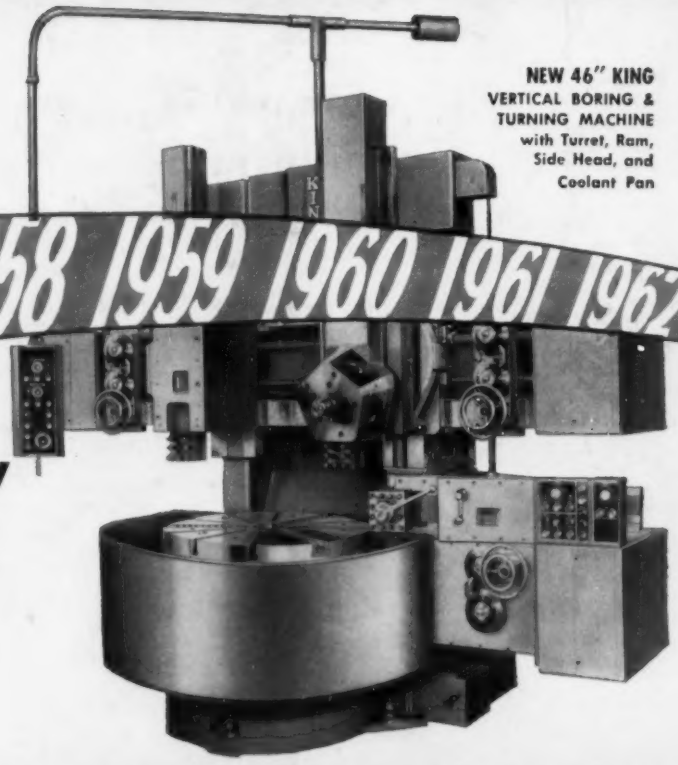
How can *we* help YOU?

For five years without stopping, these two 326 frame single reduction gearmotors were run continuously 24 hours a day at full load, one as an induction generator, the other as a gearmotor. When shut down and inspected, Master's conservative design showed *gear wear of less* than .001".

THE MASTER ELECTRIC COMPANY • Dayton 1, Ohio

You'll Be Glad TOMORROW

1956 1957 1958 1959 1960 1961 1962 19



NEW 46" KING
VERTICAL BORING & TURNING MACHINE
with Turret, Ram, Side Head, and Coolant Pan

You Chose The New KING TODAY!

The all new KING® Vertical Boring & Turning Machines have been completely re-designed and re-engineered to take maximum advantage of new cutting tools, materials, and methods—not only those of today but those which, along foreseeable lines of development, will likely become available during the years ahead.

The result of this "forward look" is a line of machines with highly advanced features designed to bring to boring mill users the *ultimate obtainable productive capacity*—for today *and* for tomorrow.

Full Electrical Operation

ALL CONTROLS CONVENIENTLY LOCATED ON MOVABLE PENDANT AND FIXED-MOUNTED SIDE HEAD PANEL

plus

ADVANCED CONSTRUCTION AND OPERATING FEATURES:

INCREASED HORSEPOWER
40 to 50 H.P. on 30" to 46" sizes. 75 to 100 H.P. on sizes 56" and up.

EXPANDED FEED AND SPEED RANGE
24 feeds from .0016 to .250 per revolution. 24 speeds in any one of three standard ranges: low, intermediate, or high.

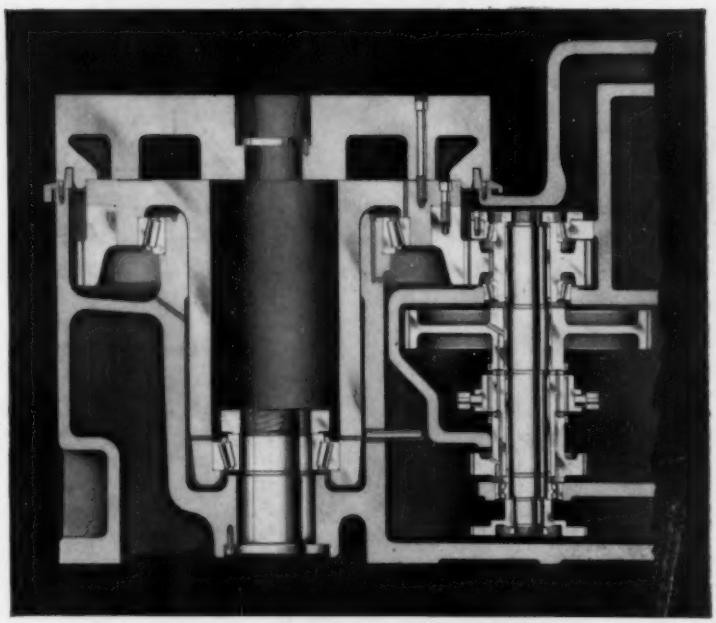
PRE-SELECTIVE FEED AND SPEED SELECTION FROM DIRECT-READING DIALS

UNIT CONSTRUCTION OF SPINDLE DRIVE
—permitting removal as a single unit for easy maintenance.

AUTOMATIC LUBRICATION OF ALL MOVING PARTS

MACHINE ADAPTED FOR OPTIONAL ADDITION OF:

- Automatic positioning of heads
- Automatic cycling
- Power rail clamping
- Power indexing of turrets
- Automatic tracing control of heads



OUTSTANDING NEW SPINDLE AND MOUNTING PROVIDES MAXIMUM TABLE STABILITY, ACCURACY

Substantially increased accuracy of spindle operation is assured by many improved construction features. As indicated in drawing above, the spindle itself is extra heavy and rigid. Tapered roller, preloaded bearings are placed so as to provide extreme stability and accuracy. Adjustment of the bearings as well as removal of the spindle assembly are quickly, easily accomplished. Helical gear spindle drive completely eliminates any tendency toward spindle deflection. The lubrication system is automatic and safety inter-locked.

● *For further details on the New King machine see the King Distributor in your area, or write us direct.*

AMERICAN STEEL FOUNDRIES, KING MACHINE TOOL DIVISION
1150 TENNESSEE AVENUE, CINCINNATI 29, OHIO

KING Vertical Boring and Turning Machines